MIT Sloan Sports Analytics Conference 2011
March 4-5, 2011, Boston, MA, USA

Forecasting Performance of International Players in the NBA

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Abstract

Over the past two decades, NBA executives have faced a challenge evaluating talent as the amount of international players entering the NBA has skyrocketed. Notable early draft selections, such as the Pistons' pick of Darko Milicic, indicate that the league may still have much to learn about what makes an international player compatible with the NBA and successful in the league. This paper examines this problem by analyzing which skills translate to the NBA game, dissecting what NBA executives value when selecting international players, and by analyzing which international statistics and characteristics are significant determinants of success in the NBA. This paper will also make predictions for the success of upcoming international prospects possible. The results of this study indicate that there are differences between how to identify superstars and role players; however, NBA teams are almost evaluating talent to their maximum ability with the available information.

1 Introduction

Evaluating talent is crucial to the success of professional sports teams. General managers, scouts, and coaches evaluate talent in order to decide which players their teams should hold on to and which players to acquire. Teams are able to acquire players through free agent signings, trades, and also through the draft.

The executives of the National Basketball Association (NBA) have faced a new challenge evaluating talent over the past two decades. The NBA has become more diverse and the league is no longer dominated by only American players. Eschker et al. [1] explains that playing in the NBA became an option for international basketball players in 1989 "when the Federation Internationale de Basketball (FIBA) voted to eliminate the distinction between amateurs and professionals, making all players eligible for FIBA competitions including the Olympics." This allowed players to represent their countries in the Olympics while they played professionally.

The influx of international players began at a low rate with players such as Drazen Petrovic and Vlade Divac successfully competing in the NBA in the early 1990s. This rate, however, increased over time. According to Eschker, one or two international players were drafted every year before 1995 until the number grew from three in 1995 to a record 14 in 2002. The following year, the 2003 draft contained a new record of 19 international players. While the 2002 and 2003 drafts were similar because of the considerable amount of international players selected, one difference between the two demonstrates the problem that NBA executives face when drafting international players. The Houston Rockets picked Yao Ming with the first pick in 2002 while the Detroit Pistons selected Darko Milicic with the second pick in 2003. Yao Ming developed into a franchise player for the Rockets and proved to be the right choice in 2002. Darko Milicic, however, has played in the NBA for eight seasons and has yet to earn consistent minutes on the court even though he was drafted over superstars Carmelo Anthony, Dwyane Wade, and Chris Bosh. Clearly, the Detroit Pistons were unable to correctly evaluate Milicic who had professional experience in Serbia prior to being drafted.

Before the influx of international players into the NBA draft, teams could focus solely on scouting and evaluating amateur players playing collegiate basketball in the United States.[1] Evaluating college players is a much simpler process compared to evaluating players overseas. While there is a small range of player ages in college basketball, which puts players on the same physical level, international basketball leagues

[1] With the exception of the period when a number of players skipped college and entered the draft straight out of high school; however, this was disallowed after the 2005 draft.

contain teenagers competing against middle-aged men. NBA teams are typically scouting younger players who are at a physical disadvantage in these games and they have to predict how these players will perform when they mature. Another challenging aspect of scouting international players is the number of professional leagues overseas. There are 24 international leagues that foreign-born NBA players have competed in. Each league has a different level of competitiveness. Also, it is simply harder and more costly for NBA teams to scout foreign players because they play outside of the United States. All of these things have posed problems for NBA teams as they try to find the next international superstar. Several notable blunders by teams in the draft show that NBA talent evaluators are still trying to figure out which foreign players will succeed in the NBA.

While there has yet to be a study that has focused on determining the most effective way to evaluate international basketball players, several studies have examined the best way to evaluate talent in professional sports. Groothuis et al.[2] use data from the 1987-1988 season through the 2003-2004 season in order to analyze how to evaluate which players will be superstars in the NBA. The results of this research finds that most superstars are drafted high but there are players drafted high who do not succeed in the NBA. Coates and Oguntimein [3] perform a similar study with the intention of examining whether college production predicts success in the NBA. The data set contains players drafted in 1987, 1988, and 1989 in order to ensure that each player included is no longer playing in the NBA. Coates and Oguntimein conclude that productive players can be identified by college statistics. Boulier et al. [4] examine whether football teams can forecast which quarterbacks and wide receivers will be successful in the National Football League (NFL). The independent variable of years played is the main measure of success for this study. With data from 1974 to 2005, they determine that football executives can successfully predict which quarterbacks and wide receivers will be successful in the league; however, no specific teams stand out as better than other teams in their predictions.

In the relevant literature, only one study focuses on the evaluation of international basketball players. Eschker, Perez, and Siegler (2004) look at foreign-born players' performance and salaries in the NBA during the 1996-1997 and 1997-1998 seasons and compare them to basketball players who are trained in the United States. The goal of this comparison is to discover whether foreign-born players are being overpaid relative to their U.S. counterparts' performance. They conclude that foreign-born players are being overpaid during this time period. It appears, however, that this trend disappears after this time period which indicates that NBA teams are improving in terms of evaluating international basketball players.

If talent evaluation of international players is truly improving, what are NBA teams doing differently? This study examines the international statistics of each foreign-born NBA player who did not compete in the NCAA in order to determine which international players will succeed in the NBA. First, correlations between NBA statistics and international statistics will be observed to see which basketball skills translate to the NBA game. Draft position will then be regressed on international league statistics and characteristics in order to discover what NBA teams have valued in the past when deciding which international players to select. Several measures of success in the NBA, which will be discussed later, will then be regressed on international statistics, league variables, and awards to determine the significant predictors of success in the NBA. This exercise will make forecasts for the success of international prospects such as Ricky Rubio and Donatas Motiejunas possible. Also, a comparison of what determines draft position with what determines different measures of success in the NBA will bring light to what NBA teams are doing right and what they are doing wrong when evaluating international prospects prior to the draft.

2 Data

The data for this study consist of every foreign-born NBA player who did not play college basketball in the United States. The summary statistics of the data can be found in Table 1. While nearly 300 foreign-born players have played in the NBA, 140 did not play in the NCAA and thus qualify for this study. Of this 140 player sample, 57 play center, 46 are forwards, and 37 are guards. These players represent 40 different countries and competed in a total of 24 professional leagues prior to playing in the NBA. The leagues that have produced the most NBA players are the Italian League and Spanish League. They have produced 27 and 26 players respectively. However, the countries of Serbia and Croatia have had more of their citizens play in the NBA than any other country. Serbia has had 15 and Croatia has produced 12.

While the 24 professional leagues are the most competitive professional leagues in their respective countries, players also compete with their professional teams in international leagues and tournaments such

as the Euroleague, the Eurocup, and the Adriatic League. The Euroleague is the most competitive league in Europe; 24 of the best teams from the professional leagues in Europe compete against each other during a regular season schedule with playoffs that follow. The Eurocup has a similar season format to the Euroleague but it is a step below the Euroleague in regards to competition. The Adriatic League only allows former Yugoslavian republics to compete. Teams from Bosnia, Croatia, Montenegro, and Serbia compete against each other during a regular season schedule that ends with playoffs. The number of players in this study who participated in the Euroleague, Eurocup, and Adriatic League are 79, 43, and 11, respectively. Many players also represent their country and play in tournaments such as the Olympics, FIBA World Championship, and FIBA regional tournaments such as FIBA America and FIBA Europe. The FIBA World Championship is a tournament that can be compared to soccer's FIFA World Cup and the FIBA regional tournaments are primarily designed as qualifying tournaments for the Olympics and the FIBA World Championship. The number of players in this study that competed in the Olympics, FIBA World, FIBA America, and FIBA Europe are 44, 35, 6, and 53, respectively.

For each player the following information was collected: physical characteristics, NBA career statistics, NBA awards, international statistics, and international awards. The physical characteristics consist of height and weight, which are measured in inches and pounds, respectively. The NBA statistics collected consist of career totals for the following categories: years played, games played, games started, minutes played, field goals made, field goals attempted, field goal percentage, three-point field goals made, three-point field goals attempted, three-point field goal percentage, free throws made, free throws attempted, free throw percentage, rebounds, assists, steals, and points. Awards won in the NBA are used to create a NBA awards index variable. All of this information is available at www.basketball-reference.com [5]. The NBA statistics used in this study include every NBA season through 2008-2009 and half of the 2009-2010 season.[2]

International statistics that are included are the same as NBA statistics with the exception of minutes played and games started. The international statistics collected include two-point field goals made, attempted, and percentage as opposed to just simply field goals.[3] An international awards index is created as the sum of several notable awards. These international statistics and information were aggregated from a variety of sources [6]. Other variables recorded are country of origin, position played, draft position, years played in each international league, and number of times each player competed in the various international tournaments.

One measure of success in the NBA that will be used in this study is John Hollinger's player efficiency rating (PER). PER measures a player's per-minute productivity. According to Hollinger, the formula "includes positive accomplishments such as field goals, free throws, 3-pointers, assists, rebounds, blocks and steals, and negative ones such as missed shots, turnovers and personal fouls" and also adjusts for the pace of the team [7]. The recorded PER on www.ESPN.com dates back to the 2002-2003; this allows for PER to be calculated for 107 of the players in this study.

In order to compare and contrast the 24 professional leagues that these international players competed in before playing in the NBA, three dummy variables will be created. For this study, we will classify each league as highly competitive, moderately competitive, and less competitive. The success of each league's teams in the Euroleague is used to indicate the competitiveness of each league.[4] Highly competitive leagues contain leagues that have had multiple successful teams in the Euroleague. These leagues are the Spanish, Italian, and Greek leagues. Moderately competitive leagues contain leagues that have had a successful team in the Euroleague. These leagues are the French, Lithuanian, Israeli, Russian, Croatian, and Serbian leagues. The rest of the leagues are categorized as less competitive. The three dummy variables, high, moderate, and low, take the value of 1 if a player played in a league that fits the

[2] Half of the 2009-2010 season is defined as every game played until the All-Star break which began on February 11, 2010.

[3] Almost all international basketball leagues split field goals into two-point field goals and three-point field goals while the NBA records field-goals which is a total of both two-pointers and three-pointers. For this study, NBA three-point field goal data are subtracted from NBA field-goal data in order to calculate NBA two-point field goal data.

[4] This success is defined by a first or second place finish after 1986 in the Euroleague, which occurs annually.

dummy's description; otherwise, the value is 0.[5] Dummy variables for the Olympics, FIBA World Championship, and Euroleague will also be included to examine the effects of playing in these competitions. These take a value of 1 if a player competed; if not, the value is 0.

Statistics and information were also collected for Ricky Rubio and Donatas Motiejunas in order to forecast their performance in the NBA. Rubio is a 20-year-old point guard from Spain. The Minnesota Timberwolves drafted him with the fifth pick in 2009; however, he elected to play for FC Barcelona of the Spanish League instead of the Timberwolves during the 2009-2010 season. He is widely considered the top international prospect with Montiejunas closely trailing him. Montiejunas is a seven-foot power forward from Lithuania. Unlike Rubio, he has yet to be drafted by an NBA team. Montiejunas played for Benetton Treviso of the Italian League during the 2009-2010 season.

3 Methods of Evaluation

The first objective of this study is to examine which skills that international basketball players exhibit and which international statistics carry over to the NBA. For example, if a player is a good passer overseas, will he be a good passer in the NBA? Or if a player converts on three-pointers overseas, will he do the same in the NBA? In order to answer these questions, correlation coefficients will be calculated. The hypothesis is that there will be strong, positive correlations for assists per game, rebounds per game, blocks per game, steals per game, and shooting percentage but there will be weak correlations for points per game, two-point field goals made and attempted, three-point field goals made and attempted, and free throws made and attempted. It is reasonable to expect that skills such as passing, rebounding, and defense carry over to the NBA while scoring would not because playing in the NBA, a more competitive league, will result in less shot attempts.

The next step in the analysis is to observe what NBA executives have valued when drafting international players. This will be done by regressing draft order on a number of variables. Least squares with White heteroskedasticity-consistent standard errors will be used. The independent variables to be considered are international per game statistics such as points, rebounds, assists, blocks, and steals. The international award index will be considered as well as control variables for position. League and tournament dummies will be included. The goal of this is to point out which statistics, skills, or types of player NBA executives covet when drafting international players. The effect of league played in and tournaments played in could also have an effect on the decisions NBA executives have made. The hypothesis is that NBA executives value taller players and players who have experience in the top international leagues when drafting.

The final portion of this analysis will attempt to model what determines success of international players in the NBA. Success will be measured by four variables: NBA award index, years played in the NBA, career NBA PER, and minutes per game. Years played measures whether a player was successful enough to have a long career in the NBA. NBA award index measures whether a player was recognized as one of the top players in the NBA. PER measures how productive each player is and minutes per game indicates whether a player was productive enough to stay on the court. These four variables will be regressed on the same variables that will be examined in the draft position models. However, because of the nature of NBA award index and years played, the method of estimation will be different for these models. NBA award index will be modeled with a Tobit regression because NBA award index has the majority of its observations at the minimum value, which is zero. Years played in the NBA will be modeled with a censored normal regression model. A censored regression model is needed because 55 of the international players that have played in the NBA are still active players; because they are active, their careers have not terminated and their years played in the NBA does not truly reflect how long their NBA careers will ultimately be. The hypothesis for the models explaining success in the NBA is that players who win awards overseas and players in the top international leagues will have the most success in the NBA. Also, it is reasonable to expect that taller players have long careers; however, they may not necessarily be more productive than the smaller players based on their PER.

The final part of this study will compute point estimates for the years played, career PER, and minutes per game played in the NBA for international prospects Ricky Rubio and Donatas Motiejunas.

[5] These dummy variables are not mutually exclusive; many players have experience in multiple leagues and therefore it is possible to be described by one or more of the competitiveness dummies. Thus, all three will be included in models.

The previously discussed models will be evaluated and then used for inference regarding these two prospects.

4 Results

The correlation coefficients explaining the relationship between international statistics and NBA statistics can be found in Table 2. Below each correlation coefficient is the p-value to test if the coefficient is significantly different than zero. Each correlation is significant at an alpha level of 0.01 except for the three shooting percentages. Two-point and three-point shooting percentage are significant at an alpha level of 0.05 while free throw percentage is not significant. While all of the correlations are positive, blocks per game has the highest correlation coefficient of 0.68. Three-pointers made and attempted have the next two highest coefficients while two-point field goal percentage, three-point field percentage, and free throw percentage have the lowest coefficients of 0.29, 0.12, and 0.03 respectively. The remaining correlation coefficients range from 0.37 to 0.51.

Table 3 contains three models with draft position as the dependent variable. Each model is based on 85 of the 140 players because a number of players are dropped because they were undrafted. Also, a few players are dropped because their international basketball statistics are unavailable. Model 3 is the strongest of the three models with an r-squared value of 0.36 and an adjusted r-squared value 0.23. According to the model, the only international statistic that is a significant determinant of draft position is blocks per game. Several of the dummy variables in the model appear to be significant determinants as well such as High, Moderate, Low, FIBA World, Forward, and Guard. While the value of these significant coefficients are difficult to interpret because of the ordinal nature of the dependent variable draft order, the sign of the coefficients can be interpreted. Blocks per game and FIBA World are both significant at an alpha level of 0.05 but blocks per game has a negative coefficient and FIBA World has a positive coefficient. Because being drafted number one is the best position in the draft, negative coefficients indicate that this variable helps a player's draft stock and positive coefficients hurt a player's draft stock. Thus, players who block shots are drafted at better positions in the draft and players who compete in the FIBA World Championship are drafted later in the draft. The model also indicates that players in the least competitive leagues tend to be drafted slightly ahead of players in other leagues.

The first measure of success that is modeled is NBA Award Index and the Tobit regressions can be found in Table 4. As variables are added from Model 1 to Model 2 and from Model 2 to Model 3, the results stay consistent but Model 3 has the highest r-squared. Thus, we will consider Model 3 as the best model of the three. Of the 101 players in the model, 80 are censored because they have not won any NBA awards. The rest of the players are uncensored. Four of the variables in this model are indicated as significant determinants of NBA Award Index: points per game and the dummy variables high, moderate, and low. Points per game has a positive coefficient; scoring more overseas prior to playing in the NBA is an indicator that a player will win more awards in the NBA. According to the coefficients of the league dummy variables, players that play in the least competitive professional leagues win more awards than players in high and moderately competitive leagues. This result may seem counterintuitive, but the results also indicate that players in the most competitive leagues win more awards than players in moderately competitive leagues.

Table 5 contains the results for three censored regression models with years played in the NBA as the dependent variable. Each model has 101 observations, 48 of which are censored because these players are active NBA players. Model 3 indicates that blocks per game, steals per game, and international awards won are significant determinants of years in the NBA. Blocks and awards are significant at an alpha level of 0.01 while steals only at 0.10. All three have positive coefficients which indicates that an increase in one of these variables leads to a longer career. None of the league or tournament dummy coefficients are significantly different from zero.

The final two measures of success that are modeled are NBA PER and NBA minutes per game. Both of these variables measure how productive a player is on the court. Table 6 reports the results of three PER models. The strongest model, Model 3, indicates that rebounds per game is a significant determinant of PER. However, models with the dependent variable of minutes played appear to be much stronger and more appropriate for inference. Table 7 contains these results. Model 3 is the strongest of the three models with an adjusted r-squared of 0.24. The model indicates that blocks per game and international awards are significant, positive determinants of minutes per game. These variables have p-values of 0.005 and 0.011, respectively. The results also indicate that the dummy variable Moderate is

significant. Playing in a moderately competitive league results in less minutes played compared to other leagues.

Table 8 contains the forecasts for the performance of the Ricky Rubio and Donatas Motiejunas. These two players are currently considered the two best international prospects. The results indicate that Montiejunas will have a more productive career than Rubio, with a PER of 17.53 compared to 10.94 for Rubio. Using these PER forecasts, Montiejunas' productivity can be compared to Antawn Jamison and Rubio's can be compared to Chris Duhon. However, Rubio is forecasted to play two years longer in the NBA.

5 Conclusion

Based on the results of this study, it appears that NBA executives are drafting well and they are taking advantage of the information they have. Up to this point, NBA teams have been targeting players who can defend the basket when drafting. Players who can defend the basket are players who contest and block a lot of shots. Because blocks per game is the most correlated statistic, the pattern of NBA teams selecting players who exhibit this skill indicates that teams already know that blocking shots in the most transferable skill from the international game. It also appears that they are aware that players who block shots tend to be productive players because they have longer careers and play more minutes. NBA executives selecting shot blockers early in the draft indicates that they are making progress in properly evaluating international basketball players.

While drafting shot blockers is one sign of progress, one thing NBA teams can improve upon is their evaluation of players who compete in the FIBA World Championships. NBA drafting patterns show that players who compete in this tournament are selected later in the draft. One can infer that NBA scouts and executives see international prospects become exposed on the big stage of the FIBA World tournament and become aware of their weaknesses. Prospects who do not compete in this tournament remain more unknown and their potentials are not damaged because their weaknesses have not been exposed. However, if a player is exposed while another player does not compete, this does not necessarily mean that the latter player would not also be exposed. All else being equal, competing in the FIBA World Championship does not affect NBA performance and it should not affect draft position.

International players who win awards overseas prior to playing in the NBA have longer careers than players who do not win awards. This makes sense because better players win awards yet NBA teams apparently fail to let these awards influence their drafting. Award winners also ultimately play more minutes per game in NBA games. Playing more minutes and more years indicates that these players are productive NBA players. Thus, players who are recognized overseas and win awards are productive players in the NBA.

NBA teams can also improve their drafting of future superstar players. Players who are great scorers overseas have a better chance of winning awards when they come to the NBA. Up to this point, points per game has not significantly affected how NBA teams draft. It also appears that players who compete in the least competitive professional leagues overseas win more NBA awards than players who play in more competitive leagues; based on drafting patterns, NBA teams are already targeting players in these leagues. While this seems odd because these leagues generally do not have as many talented players, there is a possible explanation. Players tend to begin their basketball career by playing in their home country's league. They then move onto a better league, such as the Spanish League or the Italian League if they cannot go straight from their country's league to the NBA. The better players are identified earlier and do not have the chance to compete in the top international leagues. Dirk Nowitzki and Yao Ming, who have won many awards in the NBA, are two examples of this. Nowitzki played in Germany, which is not a top league, and then was drafted by the Milwaukee Bucks. Yao Ming played in China and also went straight to the NBA to play for the Houston Rockets. On the other hand, Fabricio Oberto began his career in Argentina, which is his home country. He then played in Greece and Spain before playing in the NBA. Oberto has not won any awards in the NBA.

The differences between the significant predictors of players who become superstars and players who become productive role players exemplify how difficult it is to draft international players. Superstars are identified early and usually do not have a chance to move to more competitive international leagues before they are targeted by NBA teams. Role players, on the other hand, play for several years overseas as indicated by the amount of awards they win. The more years these players play, the more awards they have a chance to win. Therefore, to draft a superstar, teams must risk taking a young player before they have a chance to see him play against the best talent overseas. To draft a solid, productive role player, teams can

target slightly older players with more experience overseas. Because NBA teams target players in the least competitive leagues and players who block shots, it can be concluded that NBA teams are evaluating talent well. They know to they have to look in the least competitive leagues for young, potential superstars. Also, they know to target players who block shots when looking for productive role players. NBA teams would, however, benefit by taking FIBA World Championship performances less serious and by taking international awards more seriously.

After observing what NBA teams target and what they should target when drafting, it is possible to evaluate the hypotheses of this study:

1.) There will be strong, positive correlations for assists per game, rebounds per game, blocks per game, steals per game, and shooting percentage but there will be weak correlations for points per game, two-point field goals made and attempted, three-point field goals made and attempted, and free throws made and attempted. Blocks per game is the only statistics with a strong, positive correlation and shooting percentages are opposite of what was hypothesized. Also, three-point field goals made and attempted correlations are stronger than expected.
2.) NBA executives value bigger players and players who have experience in the top international leagues when drafting. It does appear NBA executives value bigger players by their focus on selecting players who block shots earlier in the draft; however, they do not prefer players in the top international leagues which turns out to be a good thing.
3.) Players who win awards overseas and players in the top international leagues will have the most success in the NBA. Also, it is reasonable to expect that bigger players have long careers; however, they may not necessarily be more productive than the smaller players based on their PER. Players who win awards do have success in the NBA but players in the top international leagues do not stand out over players in other leagues. Also, taller players may have longer careers because height is correlated with blocks per game.

The hypotheses of this study were the intuitive, rational answers to the questions posed. For example, players in the more competitive leagues succeeding in the NBA seems logical. The fact that this is incorrect proves how difficult it is to evaluate international basketball players. Many times NBA teams need to find the future successful international players in the least competitive leagues. This is before these players have a chance to go to a more competitive league and it is before another NBA team identifies the player as a potential high draft pick. Selecting international players who are young and inexperienced is high risk, high reward. It worked when Dirk Nowitzki was selected, but it did not work when the Detroit Pistons selected Darko Milicic with the second pick in the infamous 2003 draft. This situation is analogous to American players going straight from high school to the NBA, with the less competitive international leagues being similar to high school and the more competitive leagues being similar to college. Teams are forced to evaluate many international players before they have had the opportunity to showcase their talents and skills against decent competition.

At this point in time, the amount of international players in the NBA is at a peak. Nearly forty percent of all international players in the history of the NBA are still active. As these players continue their careers and retire in the upcoming years, more data will be available about their success in the NBA. Also, because current international statistics are much more accessible than the statistics of players from the early 1990s, a greater amount of accurate data will be available as international players continue to enter the NBA. Thus, the determinants of NBA success and the measures of NBA success will be better in quantity and quality in the near future. Future research focusing on the questions posed in this study will only become stronger as more data are available. A study comparing the determinants of success in the NBA of American players and international players would also be useful to examine whether NBA teams should fundamentally alter the way they scout and evaluate international players compared to college players.

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Appendix

Table 1: Summary Statistics

Variable	Mean	Median	Maximum	Minimum	Standard Deviation	Observations
Int. PPG	10.83	9.74	24.88	1.81	4.85	127
Int. RPG	4.56	3.78	14.28	1.1	2.59	127
Int. APG	1.36	1.02	6.98	0.002	1.12	126
Int. BPG	0.66	0.52	4.5	0	0.66	101
Int. SPG	1.02	0.95	3.11	0.11	0.56	122
Int. 2-FG M	3.13	2.67	8.94	0.72	1.54	114
Int. 2-FG A	5.61	4.95	13.55	1.72	2.56	114
Int. 2-FG %	55.35	55.83	70.97	35.21	5.88	114
Int. 3-FG M	0.71	0.56	3.88	0	0.73	106
Int. 3-FG A	1.96	1.70	9.63	0.01	1.83	106
Int. 3-FG %	30.01	34.32	66.67	0	14.35	106
Int. FT M	2.24	1.94	6.70	0.36	1.28	114
Int. FT A	3.14	2.85	8.05	0.82	1.53	114
Int. FT %	69.88	70.01	90.52	40.63	9.72	114
NBA PPG	5.95	4.69	22.86	0	4.72	140
NBA RPG	2.87	2.37	9.29	0	2.18	140
NBA APG	1.07	0.73	6.63	0	1.13	140
NBA BPG	0.36	0.22	2.14	0	0.42	140
NBA SPG	0.43	0.36	1.52	0	0.35	140
NBA 2-FG M	1.89	1.44	6.99	0	1.55	140
NBA 2-FG A	3.97	3.08	13.61	0.01	2.95	140
NBA 2-FG %	43.97	45.67	66.67	0	11.45	140
NBA 3-FG M	0.34	0.09	2.22	0	0.50	140
NBA 3-FG A	0.98	0.34	5.54	0	1.29	140
NBA 3-FG %	21.68	25.75	100	0	19.53	140
NBA FT M	1.14	0.75	5.71	0	1.08	140
NBA FT A	1.55	1.07	6.54	0	1.36	140
NBA FT %	66.34	71.7	100	0	19.89	140
NBA Years	3.80	3	16	1	3.09	140
NBA Games	196.90	104.50	1134	1	223.54	140
NBA MPG	15.29	13.85	36.65	0.06	9.32	140
NBA PER	10.16	11.84	26.87	-48.72	9.05	107
Int. Awards	0.55	0	10	0	1.55	140
NBA Awards	0.56	0	18	0	2.06	140
High	0.41	0	1	0	0.49	140
Moderate	0.41	0	1	0	0.49	140
Low	0.45	0	1	0	0.50	140
Euroleague	0.65	1	1	0	0.48	140
Eurocup	0.49	0	1	0	0.50	140
Olympics	0.32	0	1	0	0.47	140
FIBA World	0.30	0	1	0	0.46	140
FIBA Continent	0.47	0	1	0	0.50	140
Adriatic	0.08	0	1	0	0.27	140
Height	81.46	82	92	72	3.77	140
Weight	229.72	230	310	168	29.46	140
Draft Position	31.25	27.50	134	1	19.95	106
Age Drafted	20.94	21	25	18	1.33	107

Table 2: Correlation Coefficients

Variable 1	Variable 2	Correlation Coefficient
International Points per game	NBA Points per game	0.42 (0.000)
International Rebounds per game	NBA Rebounds per game	0.37 (0.000)
International Assists per game	NBA Assists per game	0.48 (0.000)
International Blocks per game	NBA Blocks per game	0.68 (0.000)
International Steals per Game	NBA Steals per game	0.49 (0.000)
International Two-Point Field Goals Made per game	NBA Two-Point Field Goals Made per game	0.51(0.000)
International Two-Point Field Goals Attempted per game	NBA Two-Point Field Goals Attempted per game	0.45(0.000)
International Two-Point Field Goal Percentage	NBA Two-Point Field Goal Percentage	0.29 (0.002)
International Three-Point Field Goals Made per game	NBA Three-Point Field Goals Made per game	0.55(0.000)
International Three-Point Field Goals Attempted per game	NBA Three-Point Field Goals Attempted per game	0.58(0.000)
International Three-Point Field Goal Percentage	NBA Three-Point Field Goal Percentage	0.12 (0.023)
International Free Throws Made per game	NBA Free Throws Made per game	0.46(0.000)
International Free Throws Attempted per game	NBA Free Throws Attempted per game	0.45(0.000)
International Free Throw Percentage	NBA Free Throw Percentage	0.03 (0.574)

Significance level (p-value) is in parenthesis

Table 3: Determining Draft Position

(Model) Dependent	(1) Draft Position	(2) Draft Position	(3) Draft Position
Int. PPG	0.38 (0.55)	0.10 (0.50)	0.60 (0.46)
Int. RPG	0.20 (1.04)	-0.49 (1.29)	-1.56 (1.16)
Int. APG	0.62 (1.67)	-0.63 (1.89)	2.84 (2.03)
Int. BPG	-6.68 (3.53) *	-4.65 (3.59)	-8.61 (3.40) **
Int. SPG	-0.57 (4.45)	-0.90 (4.56)	2.65 (4.27)
High		4.55 (4.00)	8.46 (3.82) **
Moderate		8.18 (4.55) *	8.37 (3.95) **
Low		8.49 (4.41) *	7.61 (4.16) *
Olympics		6.03 (4.35)	4.46 (4.49)
FIBA World		8.67 (3.33) **	8.47 (3.22) **
Euroleague		2.85 (4.40)	4.25 (4.44)
Int. Awards			-1.09 (0.87)
Forward			-16.21 (4.52) ***
Guard			-22.67 (5.83) ***
Constant	29.29 (4.42) ***	19.54 (6.96) ***	24.28 (6.99) ***
Observations	85	85	85
$\mathbf{R^2}$	0.07	0.23	0.36
Adjusted $\mathbf{R^2}$	0.01	0.11	0.23

Estimation Method: Least squares with White heteroskedasticity-consistent standard errors
*** Significant at alpha = 0.01 | | ** Significant at alpha = 0.05 | | * Significant at alpha = 0.10
Standard Errors in Parenthesis

Table 4: Determining Success with NBA Award Index

(Model) Dependent	(1) NBA Award Index	(2) NBA Award Index	(3) NBA Award Index
Int. PPG	0.47 (0.19) **	0.69 (0.21) ***	0.78 (0.24) ***
Int. RPG	0.13 (0.41)	0.26 (0.38)	0.07 (0.42)
Int. APG	0.01 (0.62)	-0.02 (0.61)	0.33 (0.74)
Int. BPG	2.32 (1.28) *	1.54 (1.40)	0.96 (1.51)
Int. SPG	1.31 (1.39)	1.51 (1.35)	1.37 (1.37)
High		-5.28 (2.04) **	-6.76 (2.34) ***
Moderate		-7.75 (2.29) ***	-8.77 (2.53) ***
Low		-4.24 (1.87) **	-5.07 (2.09) **
Olympics		1.59 (1.54)	1.22 (1.56)
FIBA World		-0.94 (1.47)	-0.80 (1.52)
Euroleague		3.71 (2.57)	3.85 (2.67)
Int. Awards			0.36 (0.33)
Forward			0.62 (1.87)
Guard			-3.15 (3.39)
Constant	-12.77 (2.53) ***	-11.02 (3.40) ***	-9.31 (3.56) **
Observations	101	101	101
Pseudo $\mathbf{R^2}$	0.18	0.26	0.29
Marginal Effects: Unconditional expectation			
Int. PPG	0.07 (0.28) **	0.05 (0.1) ***	0.04 (0.01) ***
Int. RPG	0.02 (0.06)	0.02 (0.03)	0.00 (0.03)
Int. APG	0.00 (0.09)	-0.00 (0.04)	0.02 (0.04)
Int. BPG	0.34 (0.19) *	0.11 (0.10)	0.05 (0.07)
Int. SPG	0.19 (0.21)	0.11 (0.10)	0.07 (0.07)
High		-0.52 (0.14) ***	-0.59 (0.11) ***
Moderate		-0.70 (0.16) ***	-0.66 (0.12) ***
Low		-0.31 (0.13) **	-0.28 (0.10) ***
Olympics		0.13 (0.11)	0.07 (0.08)
FIBA World		-0.06 (0.10)	-0.04 (0.07)
Euroleague		0.17 (0.18)	0.12 (0.13)
Int. Awards			0.02 (0.02)
Forward			0.03 (0.09)
Guard			-0.12 (0.17)
Marginal Effects:Conditional on NBA Award Index more than 0			
Int. PPG	0.09 (0.04) **	0.11 (0.03) ***	0.11 (0.03) ***
Int. RPG	0.03 (0.08)	0.04 (0.06)	0.01 (0.06)
Int. APG	0.00 (0.12)	-0.00 (0.09)	0.05 (0.10)
Int. BPG	0.45 (0.25) *	0.23 (0.21)	0.13 (0.21)
Int. SPG	0.25 (0.27)	0.23 (0.21)	0.19 (0.19)
High		-0.86 (0.31) ***	-1.04 (0.32) ***
Moderate		-1.19 (0.35) ***	-1.23 (0.35) ***
Low		-0.64 (0.28) **	-0.69 (0.29) **
Olympics		0.25 (0.23)	0.17 (0.21)
FIBA World		-0.14 (0.22)	-0.11 (0.21)
Euroleague		0.49 (0.39)	0.46 (0.37)
Int. Awards			0.05 (0.04)
Forward			0.09 (0.26)
Guard			-0.40 (0.47)
Marginal Effects: Probability of NBA Award Index more than 0			
Int. PPG	0.03 (0.01) **	0.03 (0.01) ***	0.02 (0.01) ***
Int. RPG	0.01 (0.02)	0.01 (0.01)	0.00 (0.01)
Int. APG	0.00 (0.03)	0.00 (0.02)	0.01 (0.02)

Int. BPG	0.13 (0.07) *	0.06 (0.05)	0.03 (0.04)
Int. SPG	0.07 (0.08)	0.06 (0.05)	0.04 (0.04)
High		-0.24 (0.08) ***	-0.28 (0.07) ***
Moderate		-0.30 (0.09) ***	-0.30 (0.08) ***
Low		-0.16 (0.07) **	-0.15 (0.06) **
Olympics		0.07 (0.06)	0.04 (0.05)
FIBA World		-0.03 (0.06)	-0.02 (0.05)
Euroleague		0.10 (0.10)	0.08 (0.08)
Int. Awards			0.01 (0.01)
Forward			0.02 (0.06)
Guard			-0.08 (0.10)

Estimate Method: Tobit Regression
*** Significant at alpha = 0.01 || ** Significant at alpha = 0.05 || * Significant at alpha = 0.10
Standard Errors in Parenthesis

Table 5: Determining Success with Years Played

(Model) Dependent	(1) Years	(2) Years	(3) Years
Int. PPG	-0.15 (0.13)	-0.07 (0.13)	-0.18 (0.13)
Int. RPG	-0.23 (0.26)	-0.15 (0.26)	-0.06 (0.26)
Int. APG	-0.21 (0.42)	0.06 (0.45)	-0.38 (0.50)
Int. BPG	2.92 (0.97) ***	2.79 (1.00) ***	2.78 (0.98) ***
Int. SPG	2.55 (1.06) **	2.31 (1.06) **	1.99 (1.02) *
High		-0.68 (1.04)	-1.43 (1.01)
Moderate		-0.94 (1.00)	-1.07 (0.93)
Low		0.77 (0.94)	1.13 (0.90)
Olympics		-1.26 (1.05)	-1.30 (0.98)
FIBA World		-0.60 (0.88)	-0.87 (0.82)
Euroleague		1.68 (1.13)	1.11 (1.08)
Int. Award			0.75 (0.25) ***
Forward			1.07 (1.05)
Guard			2.30 (1.76)
Constant	3.51 (1.13) ***	2.09 (1.81)	2.92 (1.82)
Observations	101	101	101
Pseudo $\mathbf{R^2}$	0.04	0.06	0.09

Estimation Method: Censored Normal Regression
*** Significant at alpha = 0.01 || ** Significant at alpha = 0.05 || * Significant at alpha = 0.10
Standard Errors in Parenthesis

Table 6: Determining Success with PER

(Model) Dependent	(1) PER	(2) PER	(3) PER
Int. PPG	0.18 (0.34)	0.42 (0.43)	0.28 (0.41)
Int. RPG	0.96 (0.56) *	1.00 (0.65)	1.25 (0.62) **
Int. APG	-1.00 (1.26)	-0.26 (1.54)	-0.70 (1.55)
Int. BPG	-0.18 (1.80)	0.74 (2.72)	1.05 (2.71)
Int. SPG	4.67 (2.08) **	3.56 (2.15)	2.70 (2.22)
High		-1.83 (2.37)	-3.34 (2.37)
Moderate		-3.67 (2.50)	-3.52 (2.53)
Low		-0.41 (3.09)	-0.13 (3.12)
Olympics		-0.95 (2.23)	-0.71 (2.29)
FIBA World		-4.38 (4.07)	-4.98 (4.11)
Euroleague		7.07 (5.67)	6.40 (5.57)
Int. Awards			0.94 (0.65)
Forward			4.60 (2.73) *
Guard			4.29 (3.94)
Constant	1.72 (3.88)	-1.97 (8.37)	-2.61 (8.72)
Observations	85	85	85
$\mathbf{R^2}$	0.14	0.24	0.27
Adjusted $\mathbf{R^2}$	0.08	0.12	0.13

Estimate Method: Least squares with White heteroskedasticity-consistent standard errors
*** Significant at alpha = 0.01 | | ** Significant at alpha = 0.05 | | * Significant at alpha = 0.10
Standard Errors in Parenthesis

Table 7: Determining Success with Minutes Per Game

(Model) Dependent	(1) NBA MPG	(2) NBA MPG	(3) NBA MPG
Int. PPG	0.44 (0.26) *	0.55 (0.30) *	0.39 (0.30)
Int. RPG	-0.38 (0.54)	-0.39 (0.62)	-0.31 (0.64)
Int. APG	-0.79 (1.11)	-0.58 (1.14)	-1.10 (1.26)
Int. BPG	3.77 (1.71) **	4.71 (1.91) **	4.88 (1.67) ***
Int. SPG	4.06 (2.02) **	3.63 (2.05) *	2.96 (2.04)
High		-1.07 (2.21)	-2.66 (2.30)
Moderate		-3.76 (2.11) *	-3.78 (2.09) *
Low		-2.52 (2.03)	-2.21 (1.92)
Olympics		-1.38 (2.51)	-0.95 (2.49)
FIBA World		0.18 (2.02)	-0.51 (2.00)
Euroleague		4.21 (2.15) *	2.89 (2.10)
Int. Awards			1.22 (0.47) **
Forward			5.66 (2.57) **
Guard			3.52 (4.07)
Constant	7.72 (2.15) ***	6.65 (3.56) *	7.36 (4.05) *
Observations	101	101	101
$\mathbf{R^2}$	0.19	0.26	0.35
Adjusted $\mathbf{R^2}$	0.15	0.16	0.24

Estimate Method: Least squares with White heteroskedasticity-consistent standard errors
*** Significant at alpha = 0.01 | | ** Significant at alpha = 0.05 | | * Significant at alpha = 0.10
Standard Errors in Parenthesis

Table 8: Forecast for International Prospects

Player	Variable	Point Estimate
Ricky Rubio	Years	6.99
	PER	10.94
	MPG	18.62
Donatas Motiejunas	Years	4.93
	PER	17.53
	MPG	20.09

Explanation of Awards Indices

NBA award index is the sum of total awards won and these awards include all-star appearances, Rookie of the Year, Most Valuable Player, All-Defensive team appearances, All-NBA team appearances, Sixth Man of the Year, and All-Rookie team.

International award index is the sum of the total awards won and these awards include FIBA Asia MVP, Spanish League MVP, FIBA America MVP, FIBA World MVP, Euroleague Final Four MVP, Spanish League Finals MVP, All-Euroleague MVP, Euroleague Rising Star, All-Euroleague team appearances, Italian Cup MVP, Copa del Rey MVP, Mr. Europa, Euroscar, Eurobasket MVP, Spanish Supercup MVP, FIBA Europe Under-18 MVP, Spanish League Rising Star, FIBA Europe Under-20 MVP, Eurocup MVP, and Greek League MVP