Is There a Marriage Premium in the NBA?

Introduction

We are writing this report to see if NBA players receive a marriage premium like men in other industries. The premium is that men in some industries receive a higher wage or salary because of their married status. After running multiple regressions with the data we were provided with, we concluded that NBA players do not have that same premium. This is for various reasons which we will demonstrate throughout this report.

The main research question is do NBA players who are married receive a higher wage than players who are not married? In other industries, men who are married get a slightly higher salary than their unmarried male counterparts. We wanted to find out if professional basketball players receive any premium we see in other industries.

Our dependent variable in this situation is wage or salary. The explanatory variable of interest is whether or not the player is married. For our first regression, we took wage and marriage with wage as the Y values and married as the X values.

Figure 1. Bivariate Regression

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.158116596
R Square	0.025000858
Adjusted R	0.021349176
Standard E	989.0443201
Observatio	269

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regressior	1	6697203	6697203	6.846395	0.009388
Residual	267	2.61E+08	978208.7		
Total	268	2.68E+08			

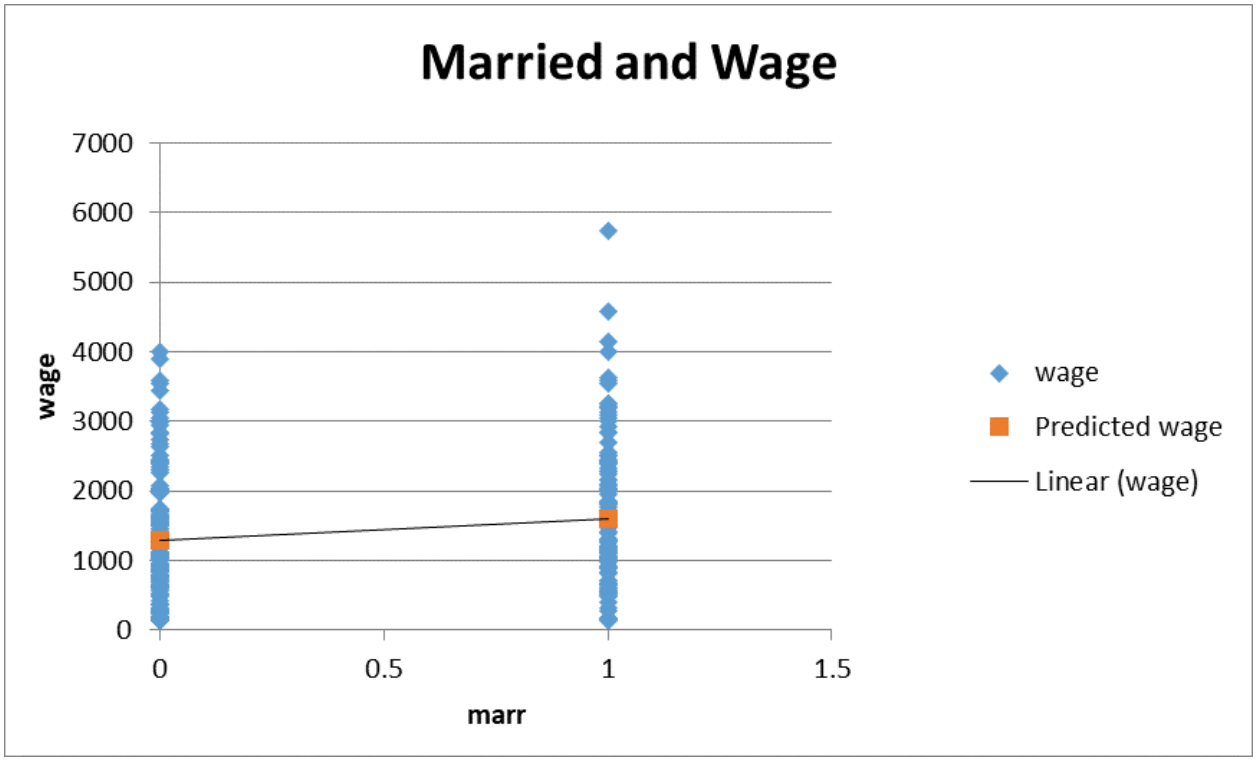
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	1283.288	80.75513	15.8911	1.77E-40	1124.29	1442.286	1124.29	1442.286
Married	317.690153	121.4151	2.616562	0.009388	78.6373	556.743	78.6373	556.743

Equation: estimated wage = 1283.288 + 317.690153(married)

Based on the results, we see a positive correlation between being married and wage. This regression shows that a married NBA player will earn 317.69 (in thousands of dollars) more than their unmarried counterparts. This model has plenty of problems. The bivariate regression does not take into account skill, age, experience, and other omitted variables. This model doesn't

establish any casualty between the two variables. This model implies that married NBA players should always earn more money than their non-married counterparts.

Figure 1.1



This graph shows players make above and below the estimated wages for married and non-married players. This graph shows that a few of the highest-paid players are married, but we can not prove that they are the highest-paid because they are married.

Figures 1 and 1.1 showcase the need for other variables to represent the estimated wages of NBA players accurately. Marriage could still be a big number but it is far from the only variable that could impact someone's wage.

Figure 2. Introduction of Control and Proxy Variables

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.721456
R Square	0.520498
Adjusted R	0.505744
Standard E	702.8745
Observatio	269

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regressior	8	1.39E+08	17428809	35.27867	1.76E-37
Residual	260	1.28E+08	494032.5		
Total	268	2.68E+08			

	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-193.85	929.3079	-0.2086	0.834927	-2023.78	1636.078	-2023.78	1636.078
married	-11.5232	94.41216	-0.12205	0.902952	-197.433	174.3866	-197.433	174.3866
black	31.617	111.129	0.284507	0.776248	-187.21	250.4444	-187.21	250.4444
games	-2.45917	2.701814	-0.91019	0.363564	-7.77939	2.861054	-7.77939	2.861054
points	109.7078	11.30651	9.703064	3.38E-19	87.44379	131.9718	87.44379	131.9718
assit	-26.6851	24.90925	-1.07129	0.285031	-75.7347	22.36446	-75.7347	22.36446
experience	78.95365	39.57366	1.995106	0.047075	1.02797	156.8793	1.02797	156.8793
allstar	38.30749	172.784	0.221707	0.824716	-301.927	378.5416	-301.927	378.5416
age	10.74692	39.97904	0.268814	0.788286	-67.977	89.47084	-67.977	89.47084

Equation: Wage = -193.85 - 11.5married + 31.62black - 2.46games + 109.71points - 26.69assits + 78.95exper + 38.31allstar + 10.75age

Control Variables: Our control variables are black, games, points, assist, experience, and age. These variables can be related to wages and marriage. These variables lower our error term which gives us a more accurate function. It helps to establish causality in our model.
Proxy Variables: All-Star is our only proxy because All-Star is our proxy for ability (how good at their job are they). A proxy is a variable that removes an omitted variable which would be ability in our case.

Explanation of Variables Included:

We included the variable black because a majority of players are African Americans. These athletes are typically some of the best players and highest paid. We added games because teams take into account the availability of the player when they are discussing wages. Points were included because scoring more points than your opponents is crucial when trying to win games. We added assists because having more assists means that the team probably scored more points and players scored after receiving a pass from this player. Experience is important in every job including basketball so we included it in our model. Lastly, we added age because players earn different wages at different parts of their career and how old a player is can show a team how much future a player has left in the NBA.

How did our results change?

Comparing our results from Figure 1 and Figure 2 we can see that marriage and the intercept decreased significantly and both went from positive numbers to negative numbers. We removed bias by adding our control and proxy variables with our dependent variable wage and our main

explanatory variable of marriage. We established that age has a positive relation with wages and marriage. This caused us to have a positive bias meaning that our original marriage estimate was measured too big and needed to be a smaller number. Experience had a positive relationship with both marriage and wage which means it had the same effect as age in overestimating the B1 value of marriage. Points, being black, and being an All-Star had the same bias and effect on the estimate of B1 for marriage. Assists and games both have a negative relationship with marriage and wages. Both have a positive bias making them also have the effect of making B1 more positive than it should have been without them as variables.

This model makes a lot more sense than the first model we ran. We feel that this model is a more accurate representation of the relationship between marriage and wages. We can explain the relationship between each variable to marriage and wage to explain the biases we found.

1. First, age has a positive bias because the older a player is the more mature they are which means they can handle a variety of different situations a player may encounter.
2. A player being mature will allow a player to get married because a spouse would not want to marry someone childish.
3. Experience has a positive bias because having more experience can make a player understand basketball situations better. More experience a player has can lead the player to become more confident in their job which can carry over to other parts of their life such as their love life meaning they are more likely to be married.
4. The relationship for points is positive to both wage and marriage as well. A player that scores more points will be more desired by teams meaning they will be competing to get a player. A player who scores more points will have more name recognition meaning more people will want to be in a relationship with that player.
5. Assist can have a negative relationship with both marriage and wages giving it that positive bias. Having a lot of assists can mean that the player is a team player meaning they will take less money to have better teammates. A player who likes having better teammates around him will be willing to sacrifice someone in their life to be a better player which means less time to spend with a girlfriend or someone they might want to marry.
6. Being black has a positive bias and relationship with marriage and wages. A majority of the players are African American which means that they will be more likely to have a higher wage than non-black players. Black players believe that marriage is very important for stability and maturity.
7. Playing games has a negative relationship with marriage and wages but has a positive bias. Playing in a lot of games means being away from non-team people which means that these players have less time to get married. Playing in a lot of games can mean that teams will be afraid of that player getting injured in the future.
9. Lastly, All-Star has a positive relationship with marriage and wages. Giving it a positive bias. An All-Star is a player recognized as a player at the highest level in the NBA, meaning teams will pay more for that player. An All-Star player may want more stability that marriage provides.

Even though we feel this model more accurately represents the relationship we feel that some variables are not accurately represented specifically age and experience. This model says that every year a player is older, they will earn 10.75 more. We feel that at some point age will work against a player's wage. For example, a 50-year player would earn more money than a 25-year player if everything's the same. We believe that this is not representative of the NBA. Older players will retire and teams will be less likely to pay an older player more money especially if they could get a 25-year-old that is the same player. We chose to take these variables into our final model by adding nonlinearities to age and experience.

Figure 3. Final Model

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.728086
R Square	0.53011
Adjusted R Square	0.508084
Standard Error	701.209
Observations	269

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regression	12	1.42E+08	11833769	24.06734	1.44E-35
Residual	256	1.26E+08	491694.1		
Total	268	2.68E+08			

	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	4523.706	3273.256	1.38202	0.16817	-1922.23	10969.64	-1922.23	10969.64
married	-16.0038	95.05227	-0.16837	0.866426	-203.188	171.1801	-203.188	171.1801
age	-264.403	181.7999	-1.45436	0.147071	-622.417	93.61072	-622.417	93.61072
age2	-1.20465	1.011666	-1.19076	0.23485	-3.1969	0.787595	-3.1969	0.787595
Age3	0.12491	0.078614	1.588898	0.113318	-0.0299	0.279722	-0.0299	0.279722
experience	212.3819	104.0577	2.041001	0.042276	7.463728	417.3001	7.463728	417.3001
experience2	-12.5489	13.76453	-0.91168	0.362794	-39.655	14.55725	-39.655	14.55725
experience 3	-0.03875	0.636405	-0.06089	0.951493	-1.29201	1.214505	-1.29201	1.214505
allstar	26.20763	174.5977	0.150103	0.880802	-317.623	370.0384	-317.623	370.0384
black	26.12394	111.3883	0.23453	0.814761	-193.23	245.4779	-193.23	245.4779
games	-2.7367	2.700075	-1.01356	0.311748	-8.05389	2.580487	-8.05389	2.580487
points	109.2667	11.36408	9.615095	6.95E-19	86.88774	131.6457	86.88774	131.6457
assist	-26.2283	25.15846	-1.04252	0.298153	-75.7722	23.31564	-75.7722	23.31564

1. Married - By adding nonlinearities to the model, our married variable was still overestimated by roughly 5. This means that marriage has a lower effect on wages when other control and proxy variables are added. Based on hypothesis testing, we reject the null hypothesis of H0: Bj = 1 with 90% confidence. This means that marriage is statistically insignificant.

2. Age - Age went from being a positive number to a negative. We believe that this is a more accurate representation of the age variable. Age is negatively correlated with wage and salary giving us a positive bias.
3. Age^2 (Age2) - This is a new variable included in the final model. We believe that this is accurate because age is a complex thing in the NBA. Age^2 would have a positive effect on marriage and a negative relationship with wages. This means that there is a negative bias meaning that without it marriage would be too low which means the married variable needed to be higher.
4. Age^3 (age3) - This is also a new variable. This variable has a positive relationship with both marriage and wage. This implies a positive bias meaning marriage needs to be lower.
5. Experience - This variable is a more positive number in Figure 3 than in Figure 2. This implies that experience is more crucial for wages than in the previous model. This variable still has the positive bias it previously had.
6. Experience^2 (experience2) - This is a newly introduced variable. This variable has a negative relationship with wages and a positive relationship with marriage. This variable has a negative bias meaning marriage needed to a bigger number.
7. Experience^3 (experience3) - Another new variable for our final model. This variable has both positive relationships with wages and marriage. This variable removes a positive bias from our error term. This means that our marriage variable was too high and needed to be smaller.
8. All-Star - This variable decreased from Figure 2 to Figure 3. All-Star was still a positive number meaning that being an All-Star increases a player's wage but the effect in previous models was estimated too high. By keeping All-Star, we still removed a positive bias.
9. Black - This variable decreased from Figure 2 to Figure 3. This variable was still positive and kept its bias effect. This variable implies that having a black skin color means earning more money. This model implies that being black was overestimated in the previous models and that it needed to be smaller.
10. Games - This variable went from being a small positive number to a small negative number. This implies that playing more games means a player’s wages will be smaller. We think that this is accurate because sometimes better players sit out games to rest and the lower-waged players will not get special treatment like the higher-salaried players.
11. Points - This variable only had a small decrease from Figure 2. This implies that scoring points are very important to a player’s wage. This variable still has a positive bias. This variable was only slightly overestimated from previous models.
12. Assists - This variable also saw little change. This variable had a slight increase from Figure 2. Implying that having more assists will lower a player’s wages. This still has the same positive bias with its negative relationships with wages and marriage.

All of the variables except points and experience are not statistically significant. Points are statistically significant because we fail to reject with 99% confidence. Experience is not

statistically significant when we look at it with 99% confidence but we fail to reject it with 95% confidence makes it for our purposes statistical significance.

We chose this as our final model because it takes into account the most important variables such as the proxy and control variables and can explain the complexities of NBA wages. This model allows us to explain the complexities of age and experience in the NBA. This model allows us to accurately predict what an NBA player's wage might be. This model also helps us to determine our main question for this report. Is there a marriage premium in the NBA? According to our Final Model, **there is no marriage premium in the NBA.** Figure 3 shows that after taking into account other control and proxy variables, being married does not have a causality with wages.

Limitations in the Final Model

In our final model, there were some omitted variables we could not account for. The first variable was what city/state. This could have several implications on the model such as taxes and weather. Another variable we can not test for would be whether or not a player might want to live there. For example, a player might take less money to live in Los Angeles than in Minneapolis. Another omitted variable would be how good the team is. A player might take less money to play on a good team or keep good players around him. Another omitted variable would be injuries. A player's health has a lot to do with wages and potential wages.

Challenges Faced

During our time working with this data, we ran into some problems that we needed to sort out. The first problem we faced was determining which control and proxy variable to use. We ran multiple regressions using a different combination of variables. We decided to choose most of the variables on factors that had to do with basketball. The other variables we chose were based on things like the majority of the NBA being African Americans.

The other challenge we had was trying to determine the best results for our models. We ran many regressions and trying to decide amongst them was hard because some of the results were similar while others were different.

Conclusion

We conclude that once we take into consideration more important factors of being an NBA player, men in the NBA do not get a premium from being married. Factors that cause a player to have a higher wage would be points, experience, and All-Star. These factors can help determine how good of a basketball player someone is. Being married in the NBA does not give players a higher salary than men in other industries might.