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DATA 6560 – Sports Analytics

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Analysis Memo #1

The Value of 3pt Shooting as Players Age

A correlation between 3P shooting and win shares has been established and I have demonstrated that it grows stronger with age. It is now time to quantify that relationship so we can start to answer the objective of this study; How to monetarily value the 3pt shot as players age. To relate 3pt shooting to monetary value, we need to first establish the value of a win share, and then determine how much of an effect the 3pt shot has on that win share at different ages. I calculated the value of one win share by comparing an average team in the NBA to a team of replacement level players. The replacement team had minimum contracts (the NBA has a sliding minimum salary as players age so I used the highest age 10+ years tenure) and was assumed to win only 25% of their games. Comparing this to the league average salary per team with an average of 50% wins in a season, I was able to derive a single win share to be equal to approximately \$6 million.

2024-2025 Season WAR Value	
Replacement Players	15
Replacement Salary (min)	\$ 3,303,771.00
Wins (25%)	21
Approved Payroll	\$ 49,556,565.00
Average Payroll	\$ 170,516,134.00
Average Wins	41
Extra wins	20
Value of 1 WAR	\$ 6,047,978.45

Now that I had a monetary value for one win share, I needed to find the contribution from 3Pt shooting to win shares. To do this, I ran a regression model using win shares as my Y variable and the following X variables: 3Pt makes, 2Pt makes, Free Throw makes, Total Rebounds, Assists. I chose 3Pt makes instead of 3pt attempt rate because 3Pt makes had the strongest positive correlation to win shares. I omitted Pts from the X variables because

it is a redundant variable when we consider 3pt, 2pt, and FT's, which make up points. I ran this regression model for the following age ranges:

Ages 19-22 (New players)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.6317824	0.21084636	-2.9964113	0.00344489	-1.0500956	-0.2134692	-1.0500956	-0.2134692
3P/Game	-0.3302009	0.17956943	-1.8388483	0.06890508	-0.6864616	0.0260597	-0.6864616	0.0260597
2PT	0.53402984	0.20367051	2.62202833	0.0101065	0.12995335	0.93810632	0.12995335	0.93810632
FT	-0.2097529	0.23034806	-0.910591	0.36470065	-0.6667568	0.24725112	-0.6667568	0.24725112
TRB	0.46851739	0.08757681	5.34978829	5.5964E-07	0.29476749	0.64226728	0.29476749	0.64226728
AST	-0.0391561	0.10804568	-0.3624035	0.71781531	-0.2535157	0.17520341	-0.2535157	0.17520341

Ages 23-29 (Players in Prime)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.6887161	0.20908052	-3.2940233	0.00113673	-1.1005833	-0.2768489	-1.1005833	-0.2768489
3P/Game	0.85908366	0.14784095	5.81086422	1.9664E-08	0.56785213	1.15031519	0.56785213	1.15031519
2PT	0.54429956	0.14892765	3.65479188	0.00031617	0.25092734	0.83767178	0.25092734	0.83767178
FT	-0.3082461	0.17984701	-1.713935	0.08783178	-0.6625263	0.04603412	-0.6625263	0.04603412
TRB	0.37769294	0.06851361	5.51267045	9.1076E-08	0.24272815	0.51265773	0.24272815	0.51265773
AST	0.01913371	0.09171475	0.208622	0.83492028	-0.161535	0.19980238	-0.161535	0.19980238

Ages 30+ (Aging players)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.800508	0.38290109	-2.0906392	0.03880262	-1.5591041	-0.0419119	-1.5591041	-0.0419119
3P/Game	0.5839184	0.20037115	2.91418394	0.00430007	0.18694701	0.9808898	0.18694701	0.9808898
2PT	0.09416223	0.17512113	0.53769773	0.59184313	-0.2527843	0.44110877	-0.2527843	0.44110877
FT	0.14807536	0.19191827	0.77155425	0.44198895	-0.2321494	0.52830007	-0.2321494	0.52830007
TRB	0.35701137	0.10661805	3.34850783	0.00110449	0.14578179	0.56824096	0.14578179	0.56824096
AST	0.3461176	0.12338325	2.8052235	0.00592173	0.10167312	0.59056208	0.10167312	0.59056208

The coefficients tell us how many win shares each additional 3pt make per game contributes. Because we know that a win share is equal to \$6 million, we can multiply this number by the coefficient to get the following results:

A 3pt shot per game is worth -\$1,997,000 for players age 19-22

A 3pt shot per game is worth \$5,195,719 for players age 23-29

A 3pt shot per game is worth \$3,531,525 for players age 30+

The method that I used produced a result in the format that I wanted; value per 3pt shot as players age. However, this is not the result I was expecting, as a 3pt shot is worth more money for players in their prime as opposed to players at the end of their career. There are a few things that I still want to explore and modify, one being relating the monetary value of the three point shot relative to the rest of a players game as they age.