Predicting the Future Salary of NFL QBs under Rookie Contracts

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By: Vincent Kim

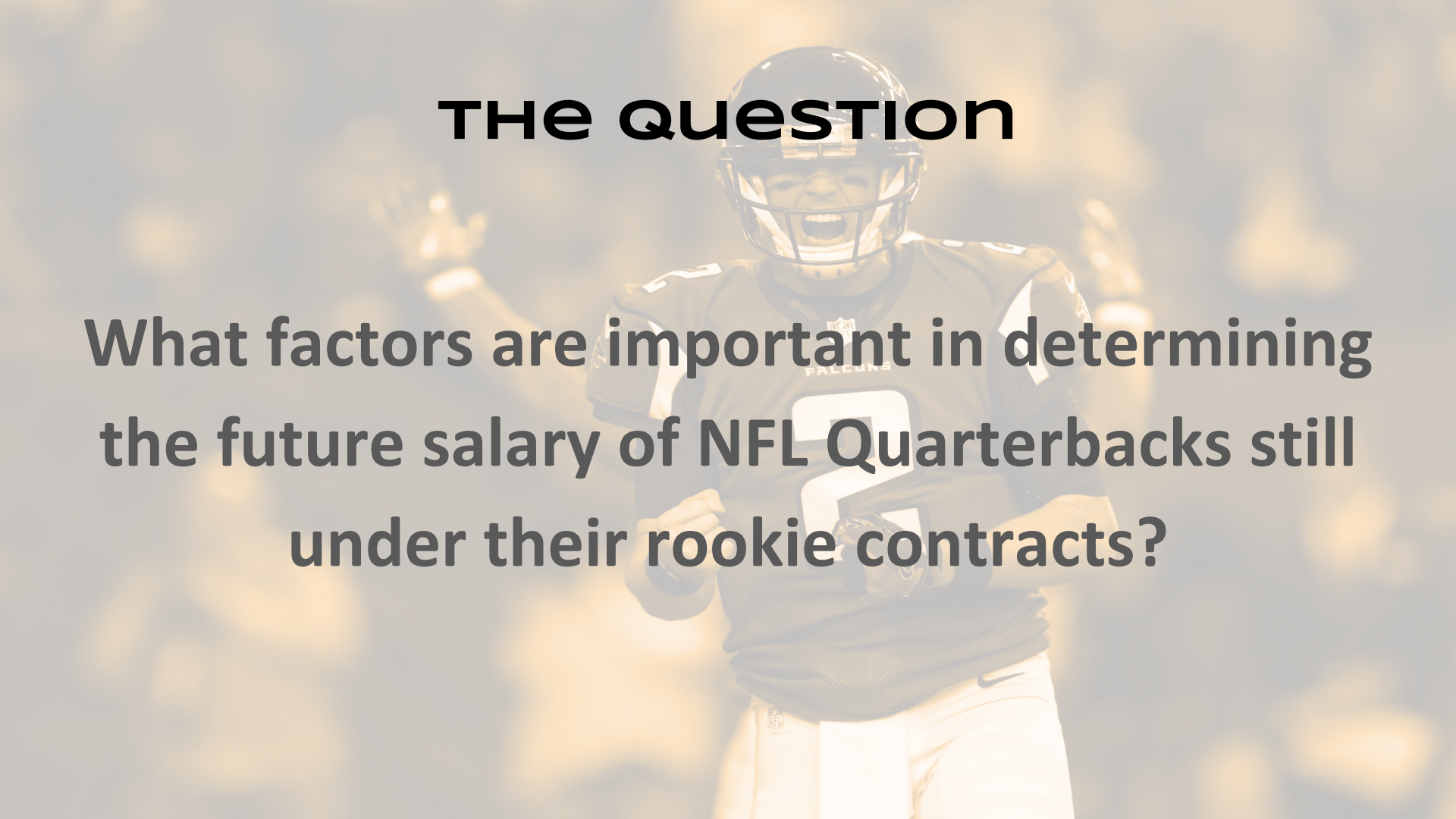
Introduction

- Every year, numerous college quarterbacks enlist into the annual NFL Draft and have their dreams realized in getting drafted by an NFL team.

- Quarterback position is one of the most important, if not the most important, position in the NFL arguably.
  - Thus, NFL teams need to do a lot of research and invest into drafting a good quarterback in order to have more success.
  - B/c quarterbacks are extremely valuable = A LOT $$$ in future contracts

Which brings me to this question...

The Question



What factors are important in determining the future salary of NFL Quarterbacks still under their rookie contracts?

Background Information

1. Under the 2011 CBA agreement, rookie contracts are required to be 4 years long.
   - Before the 2011 CBA agreement, rookie contracts weren't required to be 4 years long, but could be 5 or even 6 years long.
   - For consistency purposes, I will only look at data for the first 4 years of an NFL quarterback for this study.

2. Rookie NFL players generally are not paid a lot compared to veteran NFL players because of something known as the "Rookie Pool".

   - The Rookie Pool is the maximum limit that teams can spend their cap/money on rookie contracts.

Background Information

3. After an NFL player's rookie contract expires, they are free to sign a new contract with any team.

   - This is where most QBs cash in on that $$$.

~~4. Joe Flacco is an elite quarterback.~~

Data Description

- Initial dataset had 94 observations → Cut down to 62 on final.
  - Eliminated QBs who didn't play or make it into the NFL and didn't play enough snaps to warrant enough sample data.

- Initially had 16 variables.

variables

1. FUTURE_SALARY - The first contract the QB signs after rookie contract expired (measured in a per year basis)
2. YearDrafted - The year the QB was drafted into the NFL
3. RoundTaken - The round in which the QB was drafted into the NFL
4. AgeAfterContract - The age of the QB after their rookie contract expired
5. PassTDs - Total passing TDs during first 4 years of NFL career
6. RushTDs - Total rushing TDs during first 4 years of NFL career
7. INTs - Total INTs thrown during first 4 years of NFL career
8. FUMBs - Total fumbles during first 4 years of NFL career
9. Rush_Yards - Total rushing yards during first 4 years of NFL career
10. Pass_Yards - Total passing yards during first 4 years of NFL career

variables

11. PassAttempts - Total pass attempts during first 4 years of NFL career

12. Reg_Wins - Total regular season wins during first 4 years of NFL career (only count games in which the QB started)

13. Post_Wins - Total postseason wins during first 4 years of NFL career

14. QBR - Quarterback rating

15. PCT - Percentage of throws completed

16. Pro_Bowls - Total Pro Bowls during first 4 years of NFL career

Data Description

Table 1: Variable Descriptions

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Variable	Description
FUTURE_SALARY	The first contract the QB signs after their rookie contract expired (measured in a per year basis and by dollar)
YearDrafted	The year the QB was drafted into the NFL
RoundTaken	The round in which the QB was drafted into the NFL
AgeAfterContract	The age of the QB after their rookie contract expired
PassTDs	Total passing TDs during first 4 year of NFL career
RushTDs	Total rushing TDs during first 4 years of NFL career
INTs	Total INTs thrown during first 4 years of NFL career
FUMBs	Total fumbles during first 4 years of NFL career
Rush_Yards	Total rushing yards during first 4 years of NFL career
Pass_Yards	Total passing yards during first 4 years of NFL career
PassAttempts	Total pass attempts thrown during first 4 years of NFL career
Reg_Wins	Total regular season wins during first 4 years of NFL career (only count games in which the QB started)
Post_Wins	Total postseason wins during first 4 years of NFL career (only count games in which the QB started)
QBR	Quarterback rating
PCT	Percentage of throws completed
Pro_Bowls	Total Pro Bowls during first 4 years of NFL career

Data Description

Table 2: Summary Statistics

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Variable	Obs	Mean	Std. Dev.	Min	Max
FUTURE_SALARY	62	5940747	7629583	0	23300000
YearDrafted	62	2009.468	2.222963	2006	2013
RoundTaken	62	3.064516	2.149121	1	8
AgeAfterContract	62	26.09677	1.141033	24	32
PassAttempts	62	734.5323	676.844	16	2248
PassTDs	62	28.48387	31.07829	0	106
RushTDs	62	3.564516	5.311975	0	33
INTs	62	22	18.79222	0	69
FUMBs	62	13.56452	11.67121	0	43
Rush_Yards	62	380.5161	537.2128	-11	2571
Pass_Yards	62	4982.952	4839.309	107	15460
Reg_Wins	62	10.66129	12.69432	0	46
Post_Wins	62	0.564516	1.714174	0	9
QBR	62	72.52484	14.30255	26	102.3
PCT	62	0.577734	0.041191	0.479	0.688
Pro_Bowls	62	0.258065	0.699777	0	3

METHODS

- Multicollinearity
  - Nature of sports contains multicollinearity
  - For ex: A lot of pass attempts → more passing yards → more Pass TDs, more INTs potentially
  - Correlation cut off point at .80

```
. correlate future_salary yeardrafed roundtaken ageafterrookiecontract passattempts passtds rushtds ints fumbs rush_yards pass_yards reg_wins post_wins qbr pct probowls
(obs=62)
```

	future~y	yeardr~d	roundt~n	ageaft~t	passat~s	passtds	rushtds	ints	fumbs	rush_y~s	pass_y~s	reg_wins
future_sal~y	1.0000											
yeardrafed	0.2374	1.0000										
roundtaken	-0.3775	-0.0476	1.0000									
ageafterro~t	0.0095	0.0982	0.0375	1.0000								
passattempts	0.7312	0.1429	-0.5867	-0.0767	1.0000							
passtds	0.7998	0.1822	-0.5169	-0.0462	0.9736	1.0000						
rushtds	0.5163	0.1827	-0.4068	-0.1498	0.6066	0.6267	1.0000					
ints	0.5804	0.0718	-0.5642	-0.1231	0.9507	0.9012	0.5843	1.0000				
fumbs	0.5231	0.0396	-0.5975	-0.1223	0.8601	0.8109	0.5675	0.8315	1.0000			
rush_yards	0.5150	0.2086	-0.3868	-0.1061	0.5930	0.6422	0.8488	0.5061	0.6500	1.0000		
pass_yards	0.7608	0.1706	-0.5652	-0.0579	0.9951	0.9861	0.6364	0.9360	0.8531	0.6365	1.0000	
reg_wins	0.7502	0.1068	-0.5130	-0.0226	0.9261	0.9447	0.6549	0.8501	0.8227	0.6654	0.9397	1.0000
post_wins	0.2905	0.0931	-0.1035	0.0638	0.2497	0.3228	0.2687	0.1491	0.3083	0.3783	0.2783	0.4157
qbr	0.6366	0.2196	-0.2722	0.0910	0.5740	0.6233	0.4270	0.4565	0.5070	0.4834	0.6030	0.5778
pct	0.4948	0.2603	-0.0688	0.1769	0.3485	0.4054	0.1776	0.2840	0.2229	0.2224	0.3853	0.3684
probowls	0.5742	0.1530	-0.2511	0.0093	0.5537	0.6485	0.6526	0.4887	0.4716	0.7060	0.5935	0.6762

Final Model

Regression model:

FUTURE_SALARY = 151,020.6 * PASS_TDS - 1,563.375 * RUSH_YARDS + 130,794.6 * QBR + 1,722,651 * PRO_BOWLS - 7,696,423.

R^2 = .6821

Adjusted R^2 = .6598

P-value = .0000, statistically significant

Final Model

VARIABLES	(1) future_salary
passtds	151,021***
	(29,073)
rush_yards	-1,563
	(1,619)
qbr	130,795**
	(51,769)
probowls	1.723e+06
	(1.240e+06)
Constant	-7.696e+06**
	(3.390e+06)
Observations	62
R-squared	0.682

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

conclusions

- As expected, more passing touchdowns and higher QBR lead to higher salary.

- Rushing yards and Pro Bowls were not statistically significant with future salary.
  - Could be because Pro Bowls aren't an indication of talent of quarterbacks since it's fan voted → flawed system

- Quarterback average = $5,940,751.287

conclusions

Flaws

- **Injuries are not accounted for in this model.**

References

[1] Buschemann, A. & Deutscher, C. (2016). Does Performance Consistency Pay Off Financially for Players? Evidence From the Bundesliga. *Department of Sport Science, 71,* (27-43).