

# How Much Do Top Receivers Contribute to QB's Stats?

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## Introduction

In football, being a “*merchant*” means to be so reliant on a particular asset that despite not being genuinely good at his position, a player appears to be good due to external factors rather than his own merits. Rather than contributing to his team, a “merchant” is the beneficiary of having teammates that are far more talented than him.

For instance, after Miles Sander’s 2022 season in Philadelphia many considered him to be a good running back since he had over 1200 yards, 4.9 yards per carry, and 11 rushing touchdowns. In reality he was a mediocre running back who achieved statistical success thanks to the prowess of the Eagles’ offensive line. In 2023, when he played with Panthers’ meager offensive line, his numbers plummeted to an inefficacious 432 yards, 3.3 yards per carry, and 1 rushing touchdown. As a result, my friends call Miles Sanders an “Eagles o-line merchant”.

There are many similar debates on whether a particular quarterback is genuinely talented or is simply an “elite receiver merchant”. Answering this question is crucial given the surging rates of quarterback contracts. Does a particular quarterback inflate his passing stats by targeting a potent teammate, or is that quarterback overly scrutinized and can still perform well without his primary weapon?

In this article, we will analyze a quarterback’s stats in relation to the stats from his top receiver. We will be focusing on the 2023 season in particular because of the exorbitant quarterback contracts that were recently signed. When evaluating a quarterback’s contract, should a GM rely more on their opinion or what the stats state? Why is a particular quarterback’s numbers worse than others’ after you discount his stats with the stats from his best weapon?

This analysis hopes to provide quantifiable and objective insight to consider when evaluating a quarterback. However, there are countless factors when discussing a quarterback’s merits, and stats cannot be examined in a vacuum. While this article hopes to eliminate as much context as possible it is important to keep in mind that this article is not meant to definitively answer these questions.

## Methodology

The website Pro football reference conveniently contains the data of every QB and WR’s stats. I derived all my data from the website and took the stats from *qualifying* passers from 2023. In order to qualify, a passer must have at least 300 pass attempts throughout the season and play at least 14 games. This is to account for quarterbacks who are unlikely to be top contributors

for their top receiver. For instance, Joe Burrow missed nearly half of the season, so it's unlikely he contributed for all of Ja'Marr Chase's 1200 yards this season. However, Josh Allen played all 17 games this season, so he qualifies because he accounts for virtually all of Diggs's yardage this season. I made an exception with Justin Herbert, who started 13 games, because the Chargers' top receiver, Keenan Allen, only played in the 13 games that Herbert also played. Furthermore, I used this database to get acquire each team's *top receiver*, i.e. the player who led the team in targets.

## Quarterback's Stats

The following are tables of stats from this season before and after I removed a QB's stats from his top weapon. The top table is the QB's original stats, while the bottom table is the difference.

Player	Tm	Cmp	Att	Cmp%	Yds	TD	Int	Rate
Lamar Jackson	BAL	307	457	67.2	3678	24	7	102.7
Josh Allen	BUF	385	579	66.5	4306	29	18	92.2
Bryce Young	CAR	315	527	59.8	2877	11	10	73.7
Dak Prescott	DAL	410	590	69.5	4516	36	9	105.9
Russell Wilson	DEN	297	447	66.4	3070	26	8	98.0
Jared Goff	DET	407	605	67.3	4575	30	12	97.9
Jordan Love	GNB	372	579	64.2	4159	32	11	96.1
C.J. Stroud	HOU	319	499	63.9	4108	23	5	100.8
Trevor Lawrence	JAX	370	564	65.6	4016	21	14	88.5
Patrick Mahomes	KAN	401	597	67.2	4183	27	14	92.6
Justin Herbert	LAC	297	456	65.1	3134	20	7	93.2
Matthew Stafford	LAR	326	521	62.6	3965	24	11	92.5
Tua Tagovailoa	MIA	388	560	69.3	4624	29	14	101.1
Derek Carr	NOR	375	548	68.4	3878	25	8	97.7
Jalen Hurts	PHI	352	538	65.4	3858	23	15	89.1
Geno Smith	SEA	323	499	64.7	3624	20	9	92.1
Brock Purdy	SFO	308	444	69.4	4280	31	11	113.0
Baker Mayfield	TAM	364	566	64.3	4044	28	10	94.6
Sam Howell	WAS	388	612	63.4	3946	21	21	78.9

Player	Tm	Cmp	Att	Cmp%	Yds	TD	Int	Rate
Lamar Jackson	BAL	230	349	65.9	2820	19	6	101.7
Josh Allen	BUF	278	419	66.3	3123	21	14	91.2
Bryce Young	CAR	212	390	54.4	1863	7	9	63.7
Dak Prescott	DAL	275	409	67.2	2767	24	8	97.7
Russell Wilson	DEN	238	357	66.7	2298	16	6	92.4
Jared Goff	DET	288	441	65.3	3060	20	9	92.0
Jordan Love	GNB	313	483	64.8	3485	24	8	95.8
C.J. Stroud	HOU	239	390	61.3	2811	15	3	92.8
Trevor Lawrence	JAX	256	421	60.8	3053	17	11	85.5
Patrick Mahomes	KAN	308	476	64.7	3199	22	12	88.9
Justin Herbert	LAC	189	306	61.8	1891	13	5	86.7
Matthew Stafford	LAR	221	361	61.2	2479	18	8	89.1
Tua Tagovailoa	MIA	269	389	69.2	2825	16	9	94.0
Derek Carr	NOR	288	410	70.2	2755	20	5	99.8
Jalen Hurts	PHI	246	380	64.7	2402	16	11	84.3
Geno Smith	SEA	244	377	64.7	2730	15	5	93.9
Brock Purdy	SFO	233	339	68.7	2938	24	8	109.2
Baker Mayfield	TAM	285	430	66.3	2789	15	7	89.2
Sam Howell	WAS	309	480	64.4	2944	17	17	78.3

I also created a table with stats for the top receivers (i.e. receiver leading the team in receptions), specifically when targeted by the quarterback. For example, ‘Int’ indicates interceptions thrown when targeting that receiver.

Player	QB	Tm	Tgt	Rec	Cmp%	Yds	TD	Int	Rat
Zay Flowers	Lamar Jackson	BAL	108	77	71.3	858	5	1	106.2
Stefon Diggs	Josh Allen	BUF	160	107	66.9	1183	8	4	94.9
Adam Thielen	Bryce Young	CAR	137	103	75.2	1014	4	1	102.3
CeeDee Lamb	Dak Prescott	DAL	181	135	74.6	1749	12	1	124.3
Courtland Sutton	Russell Wilson	DEN	90	59	65.6	772	10	2	120.2
Amon-Ra St. Brown	Jared Goff	DET	164	119	72.6	1515	10	3	113.7
Romeo Doubs	Jordan Love	GNB	96	59	61.5	674	8	3	97.3
Nico Collins	C.J. Stroud	HOU	109	80	73.4	1297	8	2	129.6
Evan Engram	Trevor Lawrence	JAX	143	114	79.7	963	4	3	95.3
Travis Kelce	Patrick Mahomes	KAN	121	93	76.9	984	5	2	106.9
Keenan Allen	Justin Herbert	LAC	150	108	72.0	1243	7	2	106.6
Puka Nacua	Matthew Stafford	LAR	160	105	65.6	1486	6	3	100.2
Tyreek Hill	Tua Tagovailoa	MIA	171	119	69.6	1799	13	5	117.1
Chris Olave	Derek Carr	NOR	138	87	63.0	1123	5	3	91.5
A.J. Brown	Jalen Hurts	PHI	158	106	67.1	1456	7	4	100.6
Tyler Lockett	Geno Smith	SEA	122	79	64.8	894	5	4	86.6
Brandon Aiyuk	Brock Purdy	SFO	105	75	71.4	1342	7	3	124.0
Mike Evans	Baker Mayfield	TAM	136	79	58.1	1255	13	3	111.6
Terry McLaurin	Sam Howell	WAS	132	79	59.8	1002	4	4	81.1

As you can see, not all quarterbacks are equally affected once you remove his stats he got from his best teammate. For example, Jalen Hurts loses over 1400 yards without AJ Brown while Lamar Jackson doesn't even lose 900 without Zay Flowers. Below is a table of how much a QB loses on average per stat category.

## Quarterback's Stats Loss on Average

I created two tables showing the average reduction of stat total from a passer's stats. We can consider *targets* as *attempts* and *receptions* as *completions*. The bottom table shows the standard deviation of loss between the quarterbacks.

Att	Cmp	Cmp%	Yds	TD	Int	Rate
48.54	35.12	4.2	413.78	4.27	3.42	9.5

Att	Cmp	Cmp%	Yds	TD	Int	Rate
132.0	79.0	-1.7	1002.0	4.0	4.0	0.6

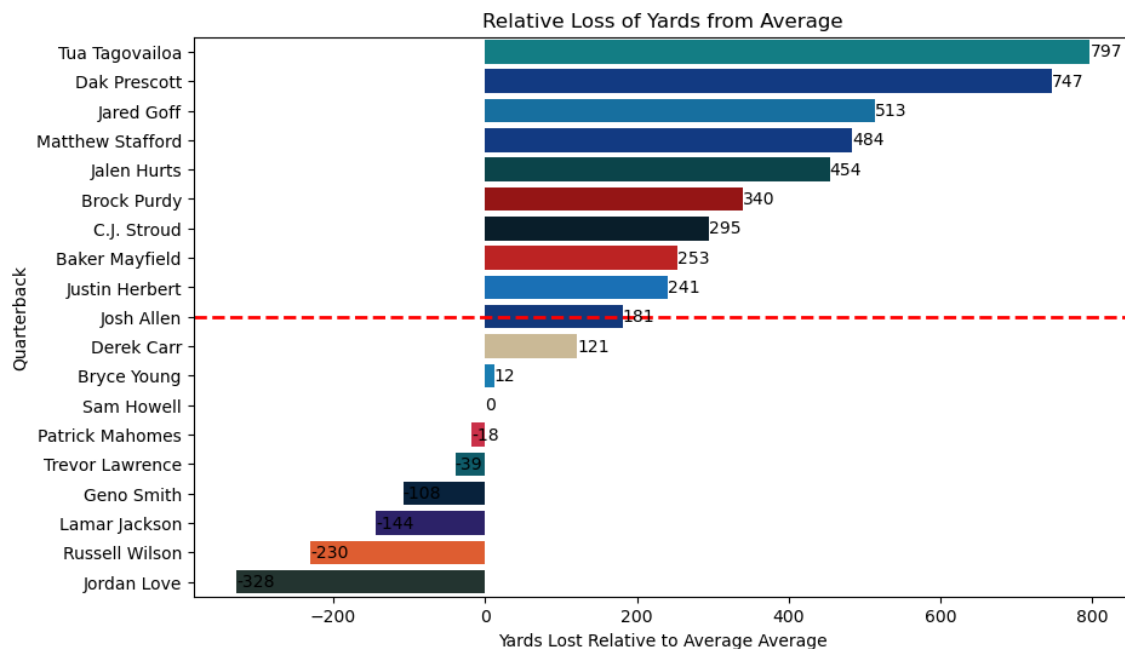
So this means that a quarterback, on average, loses about 1000 yards of his yardage total, as well as 4 touchdowns. It does make sense that a quarterback's top receiver would have a 1000 yard season. The question is if a receiver's contributions are proportional to his quarterback's contributions. Do these stats suggest a quarterback is performing above average and is significantly helping out his receiver's stats, or is it the other way around and a good receiver is making a quarterback's stats appear better than what his performance should reflect?

## Charting Differences

To see if a quarterback is a “receiver merchant”, we’d have to see how badly a quarterback’s stats would be diminished after he loses his top performer compared to other quarterbacks who also lose their top receiver. If one quarterback’s stats are more heavily impacted than other passers, then that may insinuate the quarterback’s stats are inflated by their supporting cast. I visualized this concept using the barcharts below. Each barchart also has a red dotted line along the median of each quarterback.

### Yards Lost

The first chart I made is of the quarterback’s loss of yards compared to the average quarterback’s loss. Specifically, I’m seeing the distance from the average loss of yards after you subtract a quarterback’s yardage total with his top receiver’s total. Keep in mind that positive is bad in this case, as this means he’s losing more yards than other quarterbacks. Similarly, this means negative is good, as it indicates he’s hurt less than the average quarterback would be.



Again, it is self-evident that some quarterbacks are disparaged more after you remove his top weapon. For instance, without AJ Brown, Jalen Hurts himself loses 454 more yards than the average quarterback without their corresponding top target. Conversely, MVP Lamar Jackson has a *negative* 144 yard difference, meaning that even though the average quarterback would lose 1002 yards from their yardage total, Lamar Jackson would only lose 858 yards. Does this suggest Jackson is better at distributing the ball to his other weapons and is less reliant on a high-end supporting cast? Yardage is just one volume stat reflecting a quarterback’s stat. Let’s examine a quarterback’s discounted touchdown total.

## TDs Lost

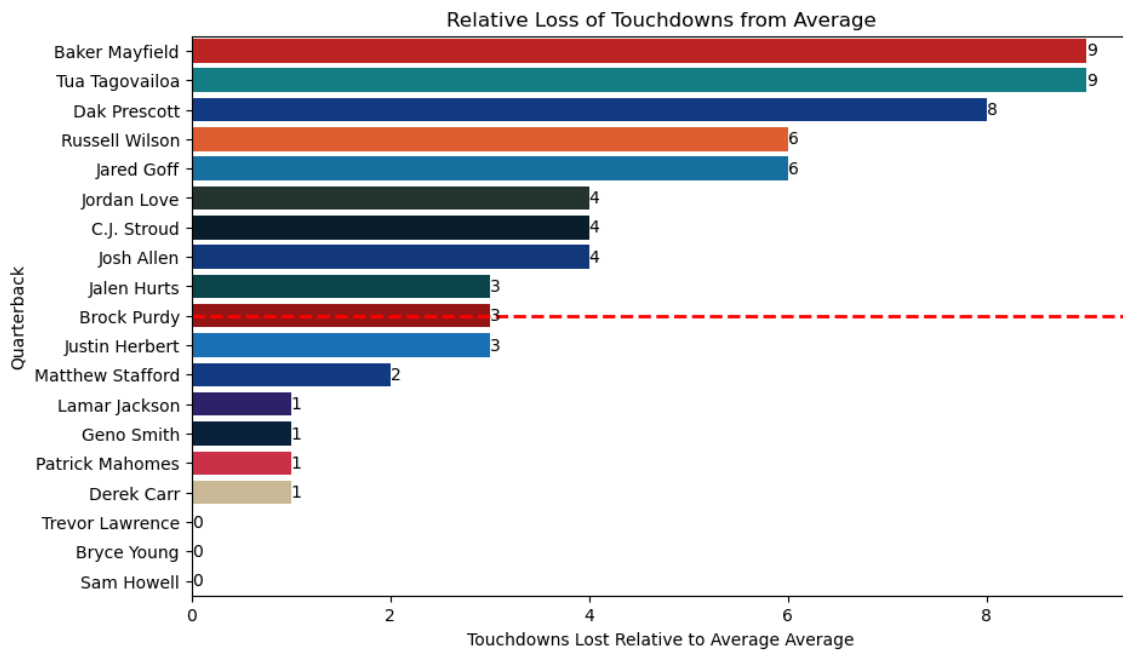


Figure 1: Touchdown Loss Barchart

Once again, some quarterbacks need their top receiver to have substantial statistical success, while others are good at distributing touchdowns to other receivers. Once again, positive is bad while negative is good. While Russell Wilson was last in negative impact of yardage subtraction, he is tied for having the third most touchdowns lost without his top target in Sutton. Tua and Dak once again the top 3 quarterbacks in terms of how intrinsically tied their statistical success is to their receiver's stats.

## Passer Rating Loss

Volume stats are significant when evaluating a player, but they don't account for efficiency. Tua lost many yards relative to the average quarterback, but he also threw the most yards in the league this year. Passer rating accounts for efficiency: if you have 4000 yards, that's not a significant achievement if you threw the ball 700 times and your passer rating would reflect that. Similarly, if you have 4000 yards but threw the ball just 500 times, that's remarkable throwing efficiency and this would reward your passer rating. Passer rating also accounts for things like TD to INT ratio, completion percentage, etc. So, here's the passer rating loss graph.

On a per throw basis, Tua's passer rating would drop significantly without Tyreek, but it wouldn't drop as badly as some other quarterbacks such as Dak (who was second behind Tua in the volume stat graphs). Quarterbacks like Stroud and Herbert, who supposedly perform well without having receivers as good as Tyreek or CeeDee Lamb, would be about as negatively affected as Tua without

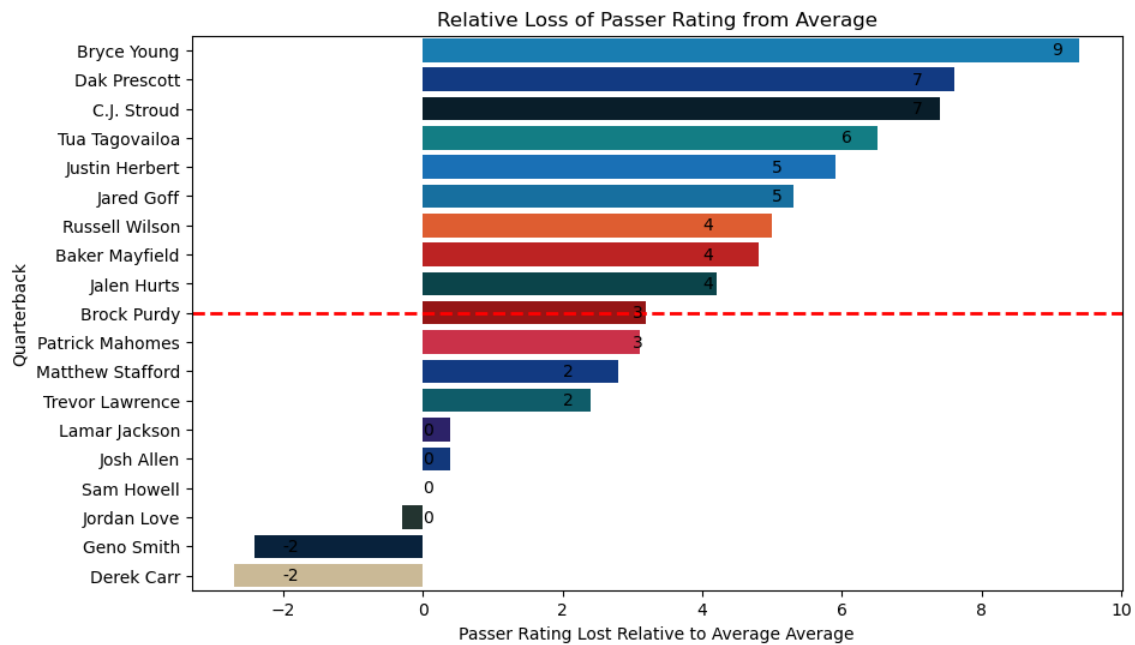


Figure 2: Passer Rating Barchart

their respective leading receivers.

## Analysis

Throughout these graphs, MVP Lamar Jackson is barely affected at all, indicative of how effective of a passer he is regardless of how talented his receiving corp is. The graphs also suggest Mahomes is barely impacted more than average without his best weapon, which is unsurprising given how he earned his third Super Bowl MVP this year despite his notoriously bad receivers.

Once again, context matters for stats. Some quarterbacks may have severe statistical drop-offs not necessarily because their set of weapons are elite, but because their set of weapons are so barren that they'd be impaired even further when you take away what little help they do have. In this particular case, the graph implies Bryce Young's passer rating is severely governed by 33 year old Adam Thielen. Does this mean that Thielen is such a potent receiver that he is the primary basis for Young's positive plays, or does this mean that the Panthers' offense is so dismal that their only somewhat reliable weapon for their rookie quarterback just happens to be their "least bad" receiver? Considering the fact that the Panthers got shut out in two consecutive weeks, I have a feeling it's more of the latter.

## Conclusion

Calling a QB an “elite receiver merchant” is a conclusion made by the “eye test”, “feel”, or other vague and subjective observations. These graphs attempted to objectively quantify how accurate these opinions are. With that being said, these stats are also inherently subjective. Rather than provide a definitive answer to the question “is X QB a merchant of Y receiver?”, these findings are meant to provide insight and help you evaluate a particular quarterback in relation to numbers from other quarterbacks and their receivers.

For instance, one who believes Tua is a Tyreek merchant can use these graphs to validate their opinion. Conversely, those who criticize Tua while simultaneously laud CJ Stroud for elevating his receivers should consider the passer rating stats that insinuate Stroud is almost as reliant on Nico Collins as Tua is on Tyreek Hill. Of course, the passer rating graph alone shouldn’t be the sole factor that dictates your opinions on these quarterbacks, rather the graph is meant to be some food for thought.

There are ways to perform more rigorous data analysis in order to get a more conclusive answer from these stats. One could perform further investigations, use more qualifying QBs, use more efficiency metrics, and use more precise calculations that can account for efficiency lost rather than sheer volume. For instance, the TD graph show the raw volume of passing TDs lost per quarterback and doesn’t account for the fact that Dak would lose more TDs than other passers because he had the most passing touchdowns in the 2023 season. Moreover, one could use data from multiple seasons to expand the sample size, use data from a team’s top 3 target rather than their single top target (is Brock Purdy good or a product of having *several* great weapons?), account for other factors such as the run game, etc.

These are meant to provide objective evidence to support an opinion, not to validate confirmation biases. Instead of espousing opinion-based narratives from talking heads, use stats, in amalgamation with non-statistical evidence, to give you a stronger understanding of football.