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

In football, being a merchant means to be so reliant on a particular asset, such as a teammate, physical attribute, and so on, that you sell yourself as a good player based on your main asset. For instance, my friends in my fantasy football team derisively call Miles Sanders an "Eagles o-line merchant", since he deceived people into thinking he was a good running back when in reality he was a mediocre running back who accumulated good stats due to the prowess of the Eagles' offensive line. After his relatively substantial contract with the Panthers, he's been completely inefficacious due to him having to rely on his own skills rather than the talent of his offensive line.

Many debate on whether a quarterback is actually good or is a "merchant" of a particular asset. It's an interesting conversation, and a critical one as well due to how exorbitant quarterback contracts can be. Can a quarterback be a merchant who inflates his stats due to his supporting cast, or is a quarterback being overly scrutinized and can still perform well without his primary weapon?

In this article, I will statistically analyze a quarterback's relationship with his top receiver and see how badly they would be affected once you discount his stats with his best target. Specifically, we will be focusing on the 2023 season, particularly because of the quarterback market's recent inflation.

Methodology

[Pro football reference](#) very conveniently contains all the data of QB and WR's stats. I derived my data from the website and then wanted to take the stats from "qualifying" quarterbacks from 2023. In order to qualify, a passer must have at least 300 pass attempts *and* play at least 14 games. This is to account for quarterbacks who are likely to be top contributors for their top receiver. For instance, Josh Allen played all 17 games this season, so he accounts for essentially all of Diggs's yardage this season. However, Joe Burrow missed nearly half of the season, so it's unlikely he was the main contributor for all of Ja'Marr Chase 1200 yards this season. I made an exception with Justin Herbert, who started 13 games, because the Chargers' top receiver, Keenan Allen, also only played those 13 games.

Below 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	308	485	63.5	3366	24	10	91.8
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	281	436	64.4	3020	26	7	97.8
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 instance, '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
Jayden Reed	Jordan Love	GNB	94	64	68.1	793	8	1	117.9
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
Chris Godwin	Baker Mayfield	TAM	130	83	63.8	1024	2	3	83.6
Terry McLaurin	Sam Howell	WAS	132	79	59.8	1002	4	4	81.1

As you can see, not all quarterbacks are as badly affected once you remove their stats they got from their 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.

| 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 an average top receiver contributes about 1000 yards of their quarterback's 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.

What does this mean? 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 me, it depends on how badly a quarterback would be hurt after he loses his top performer relative to other quarterbacks who also lose their top receiver. If one quarterback's stats are more impacted than the other, then that may insinuate the quarterback's stats are inflated by their supporting cast. I visualized this concept using the barcharts below.

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 you're losing more yards than average. Similarly, this means negative is *good*, as it indicates you're hurt less than the average quarterback would be.
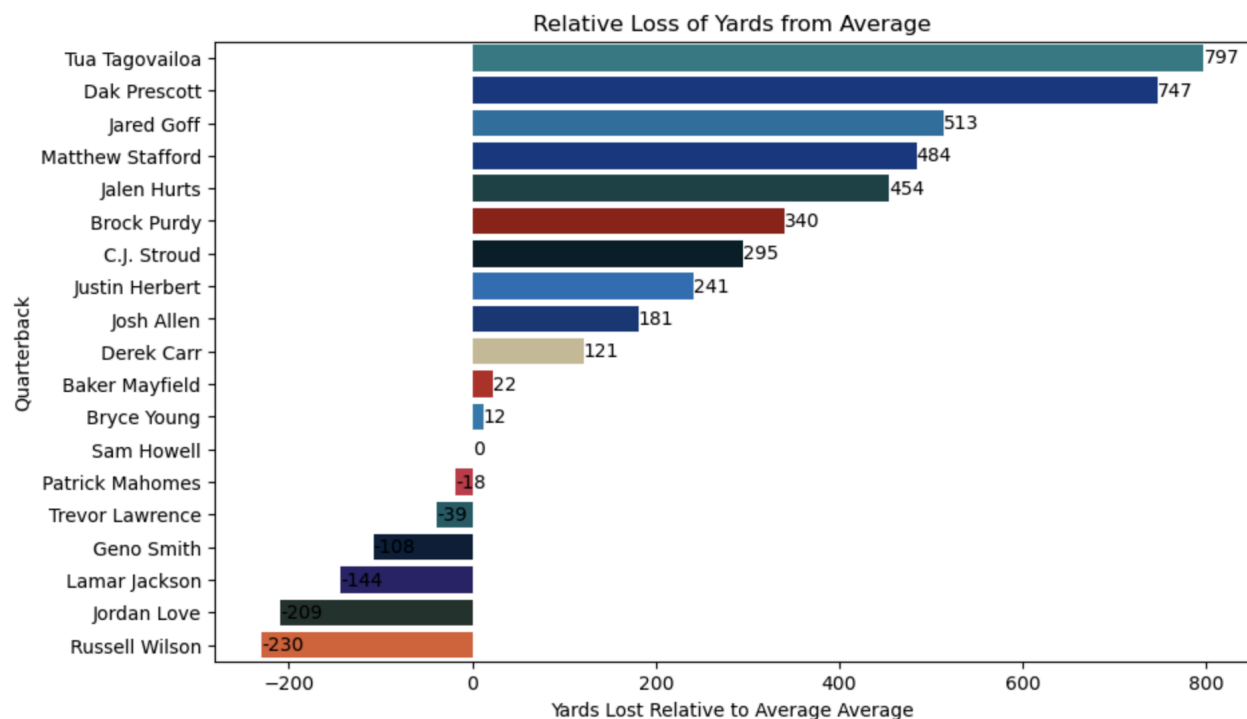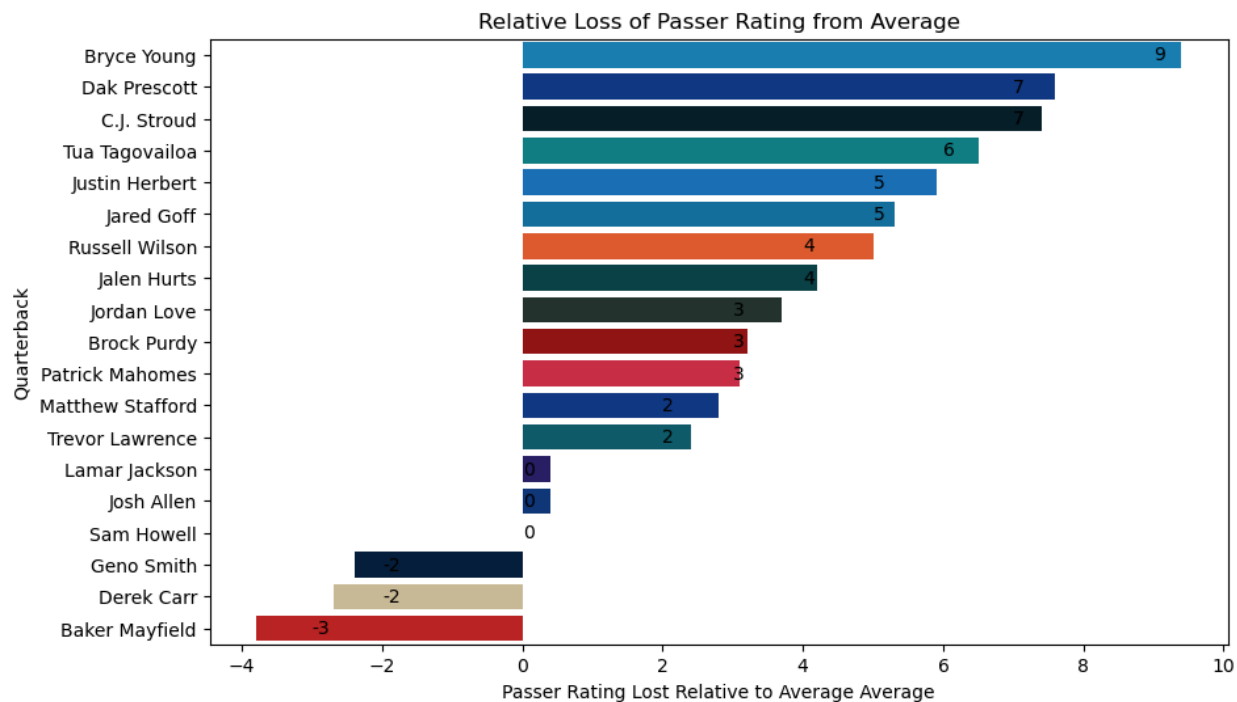

Again, it is self-evident that some quarterbacks are disparaged more after you remove his top weapon. For instance, while AJ Brown was one of the top receivers in the NFL, Jalen Hurts himself loses 454 more yards than the average quarterback without their top weapon would: while that's many yards, there are still four quarterbacks that would be impacted more negatively than him. 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.

Relative Loss of Touchdowns from Average
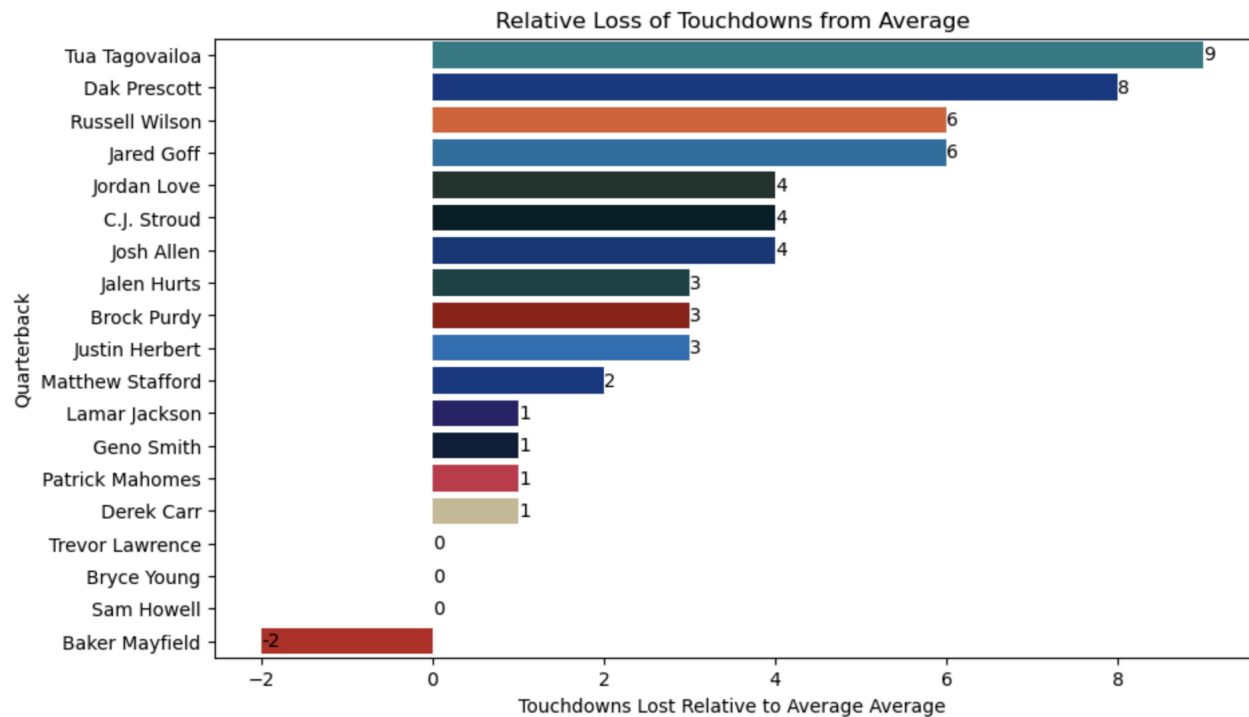
Touchdowns are also another significant quarterback stat, believe it or not. Once again, some quarterbacks need their top receiver to have substantial statistical success, while others are good at distributing touchdowns to other receivers in the end zone. Once again, positive is negative while negative is positive. While Wilson was last in negative impact of yardage subtraction, he is tied for having the third most touchdowns lost without Sutton. Tua and Dak once again the top 2 quarterbacks in terms of how intrinsically tied their statistical success is to their receiver's stats. Baker is, surprisingly, the only quarterback who hits his top receiver in the end zone less often than average.

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.

Relative Loss of Passer Rating from Average

Quarterback	Value
Bryce Young	9
Dak Prescott	7
C.J. Stroud	7
Tua Tagovailoa	6
Justin Herbert	5
Jared Goff	5
Russell Wilson	4
Jalen Hurts	4
Jordan Love	3
Brock Purdy	3
Patrick Mahomes	3
Matthew Stafford	2
Trevor Lawrence	2
Lamar Jackson	0
Josh Allen	0
Sam Howell	0
Geno Smith	-2
Derek Carr	-2
Baker Mayfield	-3

Passer Rating Lost Relative to Average Average

On a per throw basis, Tua's passer rating would drop significantly without Tyreek, but it wouldn't drop as badly as Dak's. Quarterbacks like Stroud and Herbert, who are known for performing well without having receivers as good as Tyreek or CeeDee Lamb, would be about as negatively affected as Tua without their respective leading receivers. Once again, MVP Lamar Jackson is barely impacted at all, indicative of how potent of a thrower he is with any receiver he has. Mahomes is also one of the less affected QBs in these graphs, which is unsurprising given how he earned his third Super Bowl MVP this year despite his receivers.

Once again, this stat doesn't tell the whole story. Some quarterbacks may have severe drop-offs in stats not necessarily because their set of weapons are elite, but because their set of weapons are so bare that they'd be severely crippled when you take away what little help they do have. In this particular case, Bryce Young's throwing efficiency is severely impacted once you take away 33 year old Adam Thielen's stats from him. Does this mean that Thielen is such a potent receiver that he elevates Young, or does this mean that the Panthers' offense is so dismal that their only somewhat reliable weapon for their 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

When evaluating a quarterback's performance, especially if you're adjudicating the value of his next contract, there are countless factors that come into play. Should a GM rely more on the "eye test" or what the stats state?

Calling a QB an "elite receiver merchant" is an observation made by the eye test, or "feel" for lack of a better word. These graphs attempt to statistically quantify that feeling. For instance, one who believes Tua is a Tyreek merchant can use these stats to validate their opinion. Others may feel that Tua's ability to distribute the ball to his best player, as well as the fact that he isn't the most negatively quarterback player in terms of efficiency, suggest that while he may not necessarily be an "elite" quarterback he can still drive the Dolphin's offense effectively. Conversely, those who laud CJ Stroud for elevating his receivers but criticize Tua may also ignore the stats that insinuate Stroud is reliant on Nico Collins.

As I alluded to before, the stats aren't meant to explain the whole story, rather they offer insight to form your own conclusions. One could perform further examinations, whether it'd be using multiple seasons for their sample size, use more qualifying QBs, use more efficiency metrics, and use more precise and rigorous calculations. However, combining stats in amalgamation with your opinion suggests more than espousing a narrative.