NFL Draft

InfiniteFlash

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Contents

The purpose of this document to provide a template of how to evaluate draft trades given prior trade precedent set forth before. The data I use in this document originally comes from this link: https://github.com/nflverse/nfldata/blob/master/DATASETS.md

Data Import

Import packages

Here are some basic packages to help wrangle & manipulate data.

```
library(tidyverse)
library(sqldf)
library(kableExtra)
library(ggthemes)
```

Import tables

Below are some important draft related tables I use to understand the draft's history & trades.

```
# Import draft tables
trades <- read_csv("https://raw.githubusercontent.com/leesharpe/nfldata/master/data/trades.csv")
draft_picks <- read_csv("https://raw.githubusercontent.com/leesharpe/nfldata/master/data/draft_picks.csv
draft_values <- read_csv("https://raw.githubusercontent.com/leesharpe/nfldata/master/data/draft_values.

# Idenfitifes whether a player is a QB or not
draft_picks%>%
select(pfr_id, position)%>%
filter(!is.na(pfr_id), position == 'QB')%>%
unique() -> pfr_positions
```

Trades

```
trades%>%
head()%>%
kable()%>%
kable_classic(full_width = F, html_font = "Cambria")%>%
kable_styling(latex_options = 'hold_position')
```

trade_id	season	trade_date	gave	received	pick_season	pick_round	pick_number	conditional	pfr_id
701	2002	2002-03-04	HOU	WAS	NA	NA	NA	NA	WuerDa0
701	2002	2002-03-04	WAS	HOU	NA	NA	NA	NA	DeLoJe2(
702	2002	2002-03-08	MIA	NO	2002	1	25	0	GranCh2
702	2002	2002-03-08	MIA	NO	2002	4	125	0	CravKe2(
702	2002	2002-03-08	MIA	NO	2003	1	18	0	PaceCa2(
702	2002	2002-03-08	NO	MIA	NA	NA	NA	NA	WillRi00

The `trades` table contains all players and draft picks involved in all trades since 2002.

Draft selections

```
draft_picks%>%
head()%>%
kable()%>%
kable_classic(full_width = F, html_font = "Cambria")%>%
kable_styling(latex_options = 'hold_position')
```

season	team	round	pick	pfr_id	pfr_name	player_id	side	category	position
1980	DET	1	1	SimsBi00	Billy Sims	NA	O	RB	RB
1980	NYJ	1	2	JoneLa00	Lam Jones	NA	O	WR	WR
1980	CIN	1	3	MunoAn00	Anthony Munoz	NA	O	OL	T
1980	GB	1	4	ClarBr23	Bruce Clark	NA	D	DL	DE
1980	BAL	1	5	DickCu00	Curtis Dickey	NA	O	RB	RB
1980	LARM	1	6	GreeCu21	Curtis Greer	NA	D	DL	DE

The `draft_picks` table contains all draft pick selections since 1980.

Pick values

```
draft_values%>%
head()%>%
kable()%>%
kable_classic(full_width = F, html_font = "Cambria")%>%
kable_styling(latex_options = 'hold_position')
```

The `draft_values` table provides the estimated value contained within a given draft pick.

pick	stuart	johnson	hill	otc	pff
1	34.6	3000	1000.00	3000	1.135
2	30.2	2600	717.17	2635	1.099
3	27.6	2200	514.33	2421	1.063
4	25.8	1800	490.52	2270	1.027
5	24.3	1700	467.81	2152	0.991
6	23.2	1600	446.15	2056	0.955

Table creation

So we've got 3 tables of historical draft history & values: now what?

Let's define some criteria:

- Trades involving players are difficult to quantity. For the sake of this project, I'm going to ignore all trades that involve 1 or more players.
- Future draft picks are valued a full round later than the current draft

```
# Building out a base table

trade_value_base <- trades%>%
group_by(trade_id)%>%
mutate(n = n(), draft_picks = ifelse(any(is.na(pick_season)), 0, n()))%>%
ungroup()%>%
#future picks are evaluated a round later
mutate(draft_pick_EV = ifelse(season != pick_season, (pick_round-1)*32+32, pick_number))%>%
#filter out trades with players
filter(n == draft_picks)%>%
left_join(., draft_values, by = c("draft_pick_EV"="pick"))%>%
left_join(., pfr_positions, by = c("pfr_id"="pfr_id"))%>%
select(trade_id: pick_number, position, draft_pick_EV:pff)%>%
mutate(position = ifelse(position == 'QB', 'QB', 'non-QB'))


# Trade value given & received in all trades & value chart types

trade_value_all <- trade_value_base%>%
group_by(trade_id, gave, received)%>%
summarise(stuart = sum(stuart),
          johnson = sum(johnson),
          hill = sum(hill),
          otc = sum(otc),
          pff = sum(pff))%>%
gather(chart_type, amount, stuart:pff)

# Gets information about the top pick traded in a given trade
trade_value_base%>%
group_by(trade_id)%>%
filter(draft_pick_EV == min(draft_pick_EV))%>%
select(trade_id, season, trade_date, gave, received, pick_number) -> information

# Picks traded by each team concatenated
trade_value_base%>%
```

```
    group_by(trade_id, gave, received)%>%
    summarise(trade_results = paste(sort(pick_number), collapse = ', ')) -> picks


#Write tables out to sql. Not necessary as the SQL query below can be run via R code.
con <- DBI::dbConnect(RSQLite::SQLite(), dbname = "NFL_draft.sqlite")
dbWriteTable(con,"trade_value_all", trade_value_all, overwrite = TRUE)
dbWriteTable(con,"trade_value_base", trade_value_base, overwrite = TRUE)
dbWriteTable(con,"information", information, overwrite = TRUE)
dbWriteTable(con,"picks", picks, overwrite = TRUE)
dbWriteTable(con,"draft_picks", draft_picks, overwrite = TRUE)
```

Build out summary set

Below is combining all of the information above together.

```
query = "select a.trade_id, a.gave, a.received, a.chart_type,
         a.amount as amount_given,
         b.amount as amount_received,
         a.amount-b.amount as difference,
         (a.amount-b.amount)/a.amount as given_percentage,
         (a.amount-b.amount)/b.amount as received_percentage,
         c.season, c.trade_date, c.pick_number,
         case when f.position = 'QB' then 'QB'
         else 'non-QB' end as position,
         d.trade_results as given,
         e.trade_results as offered,
         f.pfr_name
         from trade_value_all as a
         left join trade_value_all as b on a.trade_id = b.trade_id and a.chart_type = b.chart_type and a
         inner join information as c on a.trade_id = c.trade_id and a.gave = c.gave and a.received = c.r
         inner join picks as d on a.trade_id = d.trade_id and a.gave = d.gave
         inner join picks as e on a.trade_id = e.trade_id and a.gave = e.received
         left join draft_picks as f on c.season = f.season and c.pick_number = f.pick
         where b.amount > 0 and a.amount > 0
         order by 1, a.chart_type
        "
summary_set <- sqldf(query)

summary_set%>%
head()%>%
kable()%>%
kable_classic(full_width = F, html_font = "Cambria")%>%
kable_styling(latex_options = 'hold_position')
```

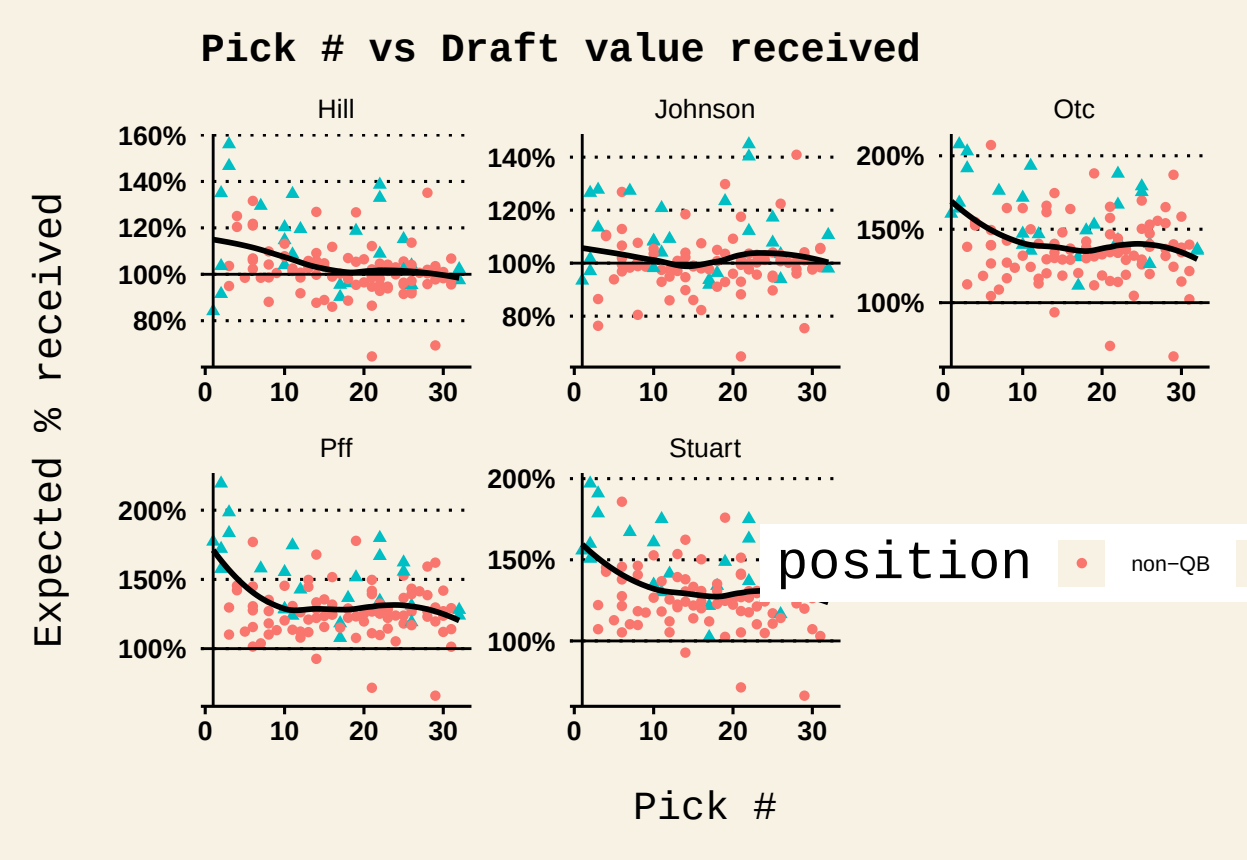
trade_id	gave	received	chart_type	amount_given	amount_received	difference	given_percentage	received
16	DET	CLE	hill	446.150	587.170	-141.020	-0.3160820	
16	DET	CLE	johnson	1600.000	2030.000	-430.000	-0.2687500	
16	DET	CLE	otc	2056.000	3073.000	-1017.000	-0.4946498	
16	DET	CLE	pff	0.955	1.384	-0.429	-0.4492147	
16	DET	CLE	stuart	23.200	33.800	-10.600	-0.4568966	
17	SF	PHI	hill	305.410	302.370	3.040	0.0099538	

A few notes:

- `amount_given` is the amount that the **gave** team traded away.
- `amount_received` is the amount that the **gave** team received.
- `difference` is the expected amount of value the **gave** team received.
- `given_percentage` and `received_percentage` give an idea of how much value the **gave** and **received** teams got relative to the amount trade away.

Results: Draft history value

```
summary_set%>%
mutate(chart_type = tools::toTitleCase(chart_type))%>%
filter(pick_number <= 32, amount_received > 0, amount_given > 0
       # , position %in% c('QB', 'non-QB')
       # ,chart_type == 'hill'
       )%>%
# select(-position)%>%
ggplot(aes(x = pick_number, y= amount_received/amount_given))+
geom_point(size = 1.5, aes(size = 2, color = position, shape = position))+
geom_vline(xintercept = 1)+
geom_hline(yintercept = 1)+
geom_smooth(se= FALSE,
            color = 'black')+
theme_wsj()+
facet_wrap(. ~ chart_type, scale = 'free')+
labs(x = '\nPick #',  y= 'Expected % received\n', title = 'Pick # vs Draft value received')+
        theme(legend.position = c(0.85, 0.25),
              legend.background = element_rect(fill = "white", colour = NA),
              text = element_text(size=10),
              plot.title = element_text(size = 15),
              axis.title=element_text(size=15),
              strip.text = element_text(size = 10))+
 scale_y_continuous(labels = scales::percent)
```



And guala, now we have a historical draft trade chart showing how much teams typically recoup when trading down.

`Non-QB` and `QB` represents if team trading up, picked a QB with the top pick being traded.

It is nice to see the old trope of teams overpaying, when they pay for QB. Hence the cluster of QBs in the top left corner of each subplot.