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THIS PDF IS A W.I.P

```
# packages
suppressMessages(suppressWarnings(library(tidyverse)))
suppressMessages(suppressWarnings(library(valstats)))
```

```
# reading data
valdf <- read_rib("vctpd.xlsx")
list2env(valdf, .GlobalEnv)
```

```
## <environment: R_GlobalEnv>
```

```
# NOTE: TRANSFORM METHODS INTO FUNCTIONS LATER
```

Valorant Theories 1 - Are eco round wins a team effort?

Does the "Hero Buy" exist?

Examining True Ecos

```
# getting total eco rounds
eco1 <- Rounds %>% filter(team1LoadoutTier == 1 & team2LoadoutTier > 2)
eco2 <- Rounds %>% filter(team2LoadoutTier == 1 & team1LoadoutTier > 2)

# getting eco round wins
ecowin1 <- Rounds %>% filter(team1LoadoutTier == 1 & team2LoadoutTier > 2
                             & winningTeamId == teamOneId)
ecowin2 <- Rounds %>% filter(team2LoadoutTier == 1 & team1LoadoutTier > 2
                             & winningTeamId == teamTwoId)

# Checking if coded correctly
#table(eco1$team1LoadoutTier, eco1$team2LoadoutTier)
#table(eco2$team1LoadoutTier, eco2$team2LoadoutTier)

#table(ecowin1$team1LoadoutTier, ecowin1$team2LoadoutTier)
```

```
#table(ecowin2$team2LoadoutTier, ecowin2$team1LoadoutTier)

# binding the data together
eco <- bind_rows(eco1, eco2)
ecowins <- bind_rows(ecowin1, ecowin2)

#n_distinct(Rounds$roundId) #15056 total rounds
#n_distinct(eco$roundId) # 1415 eco rounds
#n_distinct(ecowins$roundId) # 131 eco round wins

# Getting IDs I need + making sure data is correct
ecowins_ids <- ecowins %>% select(roundId, teamOneId, teamTwoId,
                        team1LoadoutTier, team2LoadoutTier, winningTeamId)
#head(ecowins_ids, 10)
```

Across 15,056 VCT 2022 rounds, 1415 rounds (9.4%) are classified as eco rounds. We count a round as an eco round if one team's loadout is worth between 0-5k credits (Eco buy) and the enemy's loadout is worth more than 10k credits (Half- buy - Full-buy). We say this because data shows that the greatest increase in winrate occurs when a team's loadout is worth 10k+ credits more than the opponent (https://twitter.com/ZukeStats/status/1574555496035815424?s=20).

Of those 1415 eco rounds, 131 (9.3%) were won by the team on the eco buy. We want to investigate if multikills are required for an eco win or if it is more of a team effort.

We expect, from intuition, to have results in favor of multikills proving essential to winning ecos.

```
# getting winning team ids to filter with other data set
winners <- ecowins_ids %>% select(roundId, winningTeamId) %>%
  slice(rep(1:n(), each = 10)) %>% arrange(roundId)
#winners

# filtering only eco win rounds
RPS_ecowins <- RPS %>% filter(roundId %in% ecowins_ids$roundId) %>%
  arrange(roundId)
# filtering only players who were on the team that won the eco]
RPS_ecowins <- RPS_ecowins %>% filter(teamId == winners$winningTeamId)
# checking # of rounds matches between data sets
#n_distinct(RPS_ecowins$roundId) #131 rounds

# filtering for multi-kills
RPS_ecowins_filtered <- RPS_ecowins %>% filter(kills>=2)
# checking # of rounds where a multi-kill occurred
#n_distinct(RPS_ecowins_filtered$roundId) #128 rounds

# Checking # of rounds where multiple multi-kills occurred on the same team
dupes <- RPS_ecowins_filtered %>%
  filter(duplicated(RPS_ecowins_filtered$roundId)) %>%
  arrange(roundId)
#table(dupes$kills)
# 40 rounds
#table(RPS_ecowins_filtered$kills)
```

Out of the 131 eco rounds that were won, 128 of them (97.7%) involved at least one multi-kill from the winning team.

105 (82.0%) of the 128 rounds involved a player achieving 2 kills and 63 (49.2%) rounds with a player achieving 3 or more kills.

Of the 128 rounds with at least one multi-kill, 88 (68.8%) of them only involved one multi-kill. So, 88 (67.2%) of all 131 eco round wins involved a single player achieving a multi-kill.

35 out of 88 (39.8%) sole multi-kill players had 2 kills 53 out of 88 (60.2%) sole multi-kill players had 3 or more kills

In summary:

- 97.7% (128/131) of eco round wins involved at least one multi-kill from the team that won

- 67.2% (88/131) of eco round wins involved only one player achieving a multi-kill from the team that won

- 40.5% (53/131) of eco round wins required a player to solely achieve 3 or more kills to win the round

Examining Light v Heavy Buys

```
# getting total light rounds
light1 <- Rounds %>% filter(team1LoadoutTier == 1 & team2LoadoutTier >= 3 |
                              team1LoadoutTier == 2 & team2LoadoutTier == 4)
light2 <- Rounds %>% filter(team2LoadoutTier == 1 & team1LoadoutTier >= 2 |
                              team2LoadoutTier == 2 & team1LoadoutTier == 4)

# getting light round wins
lightwin1 <- Rounds %>% filter(team1LoadoutTier == 1 & team2LoadoutTier >= 3 &
                                 winningTeamId == teamOneId |
                               team1LoadoutTier == 2 & team2LoadoutTier == 4 &
                                 winningTeamId == teamOneId)
lightwin2 <- Rounds %>% filter(team2LoadoutTier == 1 & team1LoadoutTier >= 2 &
                                 winningTeamId == teamTwoId |
                               team2LoadoutTier == 2 & team1LoadoutTier == 4 &
                                 winningTeamId == teamTwoId)

# Checking if coded correctly
#table(light1$team1LoadoutTier, light1$team2LoadoutTier)
#table(light2$team1LoadoutTier, light2$team2LoadoutTier)

#table(lightwin1$team1LoadoutTier, lightwin1$team2LoadoutTier)
#table(lightwin2$team2LoadoutTier, lightwin2$team1LoadoutTier)

# binding the data together
light <- bind_rows(light1, light2)
lightwins <- bind_rows(lightwin1, lightwin2)

#n_distinct(light$roundId) # 3131 light v heavy rounds
#n_distinct(lightwins$roundId) # 488 light v heavy round wins

# Getting IDs I need + making sure data is correct
lightwins_ids <- lightwins %>% select(roundId, teamOneId, teamTwoId,
                             team1LoadoutTier, team2LoadoutTier, winningTeamId)
#head(lightwins_ids, 10)
```

Across 15,056 VCT 2022 rounds, 3131 rounds (20.8%) are classified as light v heavy buy rounds. We count a round as a light v heavy round if one team's loadout is worth at least 10k more than the opposing team. Classified as eco-buy vs semi or full buy and semi-eco vs full buy.

Of those 3131 eco rounds, 488 (15.6%) were won by the team on the light buy. We want to investigate if multikills are required for a light v heavy buy win or if it is more of a team effort.

```r
# getting winning team ids to filter with other data set
lightwinners <- lightwins_ids %>% select(roundId, winningTeamId) %>%
  slice(rep(1:n(), each = 10)) %>% arrange(roundId)
#lightwinners

# filtering only light win rounds
RPS_lightwins <- RPS %>% filter(roundId %in% lightwins_ids$roundId) %>%
  arrange(roundId)
# filtering only players who were on the team that won the eco]
RPS_lightwins <- RPS_lightwins %>% filter(teamId == lightwinners$winningTeamId)
# checking # of rounds matches between data sets
#n_distinct(RPS_lightwins$roundId) #488 rounds

# filtering for multi-kills
RPS_lightwins_filtered <- RPS_lightwins %>% filter(kills>=2)
# checking # of rounds where a multi-kill occurred
#n_distinct(RPS_lightwins_filtered$roundId) #468 rounds

# Checking # of rounds where multiple multi-kills occurred on the same team
lightdupes <- RPS_lightwins_filtered %>%
  filter(duplicated(RPS_lightwins_filtered$roundId)) %>%
  arrange(roundId)
#table(lightdupes$kills)
# 178 rounds
#table(RPS_lightwins_filtered$kills)
```

Out of the 488 light rounds that were won, 468 of them (95.9%) involved at least one multi-kill from the winning team.

432 (92.3%) of the 468 rounds involved a player achieving 2 kills and 214 (45.7%) rounds with a player achieving 3 or more kills.

Of the 468 rounds with at least one multi-kill, 290 (62.0%) of them only involved one multi-kill. So, 290 (59.4%) of all 488 light round wins involved a single player achieving a multi-kill.

138 out of 290 (47.6%) sole multi-kill players had 2 kills 152 out of 290 (52.4%) sole multi-kill players had 3 or more kills

In summary:

- 95.9% (468/488) of light round wins involved at least one multi-kill from the team that won

- 59.4% (290/488) of light round wins involved only one player achieving a multikill from the team that won

- 31.1% (152/488) of light round wins required a player to solely achieve 3 or more kills to win the round

Generating Stats for Comparison

To make sense of this data, we need to compare it to something else. How do these numbers look next to averages of traditional gun rounds? Do multikills have more of an effect in eco and light buy rounds or do they have the same effect as they do in even rounds?

```r
# getting gun rounds
gun <- Rounds %>% filter(team1LoadoutTier >= 3 & team2LoadoutTier >= 3)

# Checking if coded correctly
#table(gun$team1LoadoutTier, gun$team2LoadoutTier)

#n_distinct(gun$roundId) # 10297 gun rounds

# Getting IDs I need + making sure data is correct
gun_ids <- gun %>% select(roundId, teamOneId, teamTwoId,
                          team1LoadoutTier, team2LoadoutTier, winningTeamId)
#head(gun_ids, 10)
```

Across 15,056 VCT 2022 rounds, 10,297 rounds (68.4%) are classified as gun rounds. We count a gun round if both team's loadouts are worth at least 10k.

```r
# getting winning team ids to filter with other data set
gunwinners <- gun_ids %>% select(roundId, winningTeamId) %>%
  slice(rep(1:n(), each = 10)) %>% arrange(roundId)
#gunwinners

# filtering only gun rounds
RPS_gun <- RPS %>% filter(roundId %in% gun_ids$roundId) %>%
  arrange(roundId)
# filtering only players who were on the team that won the round
RPS_gunwins <- RPS_gun %>% filter(teamId == gunwinners$winningTeamId)
# checking # of rounds matches between data sets
#n_distinct(RPS_gunwins$roundId) #10297 rounds

# filtering for multi-kills
RPS_gunwins_filtered <- RPS_gunwins %>% filter(kills>=2)
# checking # of rounds where a multi-kill occurred
#n_distinct(RPS_gunwins_filtered$roundId) #9720 rounds

# Checking # of rounds where multiple multi-kills occurred on the same team
gundupes <- RPS_gunwins_filtered %>%
  filter(duplicated(RPS_gunwins_filtered$roundId)) %>%
  arrange(roundId)
#table(gundupes$kills)
# 3611 rounds
#table(RPS_gunwins_filtered$kills)
```

Out of the 10297 gun rounds, 9720 of them (94.4%) involved at least one multi-kill from the winning team.

9311 (95.8%) of the 9720 rounds involved a player achieving 2 kills and 3219 (33.1%) rounds with a player achieving 3 or more kills.

Of the 9720 rounds with at least one multi-kill, 6109 (62.8%) only involved one multi-kill. So, 6109 (59.3%) of all 10297 gun rounds involved a single player achieving a multi-kill.

3141 out of 6109 (51.4%) sole multi-kill players had 2 kills 2968 out of 6109 (48.6%) sole multi-kill players had 3 or more kills

In summary:

- 94.4% (9720/10297) of gun round wins involved at least one multikill from the team that won

- 59.3% (6109/10297) of gun round wins involved only one player achieving a multikill from the team that won

- 28.8% (2968/10297) of gun round wins required a player to solely achieve 3 or more kills to win the round

Let's take a second to look back at the last result for the past 3 analyses:

- 40.5% (53/131) of eco round wins required a player to solely achieve 3 or more kills to win the round

- 31.1% (152/488) of light round wins required a player to solely achieve 3 or more kills to win the round

- 28.8% (2968/10297) of gun round wins required a player to solely achieve 3 or more kills to win the round

These statistics vary the most between the analyses, but the pattern may also just be from the increasing sample size between groups. Let's do one more analysis on a comparison group, but with a smaller sample size: pistols.

```
# getting pistol rounds
pistol <- Rounds %>% filter(is.na(team1LoadoutTier) & is.na(team2LoadoutTier))

# Checking if coded correctly
#table(pistol$team1LoadoutTier, pistol$team2LoadoutTier)

#n_distinct(pistol$roundId) # 1422 pistol rounds

# Getting IDs I need + making sure data is correct
pistol_ids <- pistol %>% select(roundId, teamOneId, teamTwoId,
                                team1LoadoutTier, team2LoadoutTier, winningTeamId)
#head(pistol_ids, 10)
```

Across 15,056 VCT 2022 rounds, 1422 rounds (9.4%) are classified as pistol rounds.

```
# getting winning team ids to filter with other data set
pistolwinners <- pistol_ids %>% select(roundId, winningTeamId) %>%
  slice(rep(1:n(), each = 10)) %>% arrange(roundId)
#pistolwinners

# filtering only gun rounds
RPS_pistol <- RPS %>% filter(roundId %in% pistol_ids$roundId) %>%
  arrange(roundId)
# filtering only players who were on the team that won the round
RPS_pistolwins <- RPS_pistol %>% filter(teamId == pistolwinners$winningTeamId)
# checking # of rounds matches between data sets
#n_distinct(RPS_pistolwins$roundId) #1422 rounds
```

```
# filtering for multi-kills
RPS_pistolwins_filtered <- RPS_pistolwins %>% filter(kills>=2)
# checking # of rounds where a multi-kill occurred
#n_distinct(RPS_pistolwins_filtered$roundId) #1386 rounds

# Checking # of rounds where multiple multi-kills occurred on the same team
pistoldupes <- RPS_pistolwins_filtered %>%
  filter(duplicated(RPS_pistolwins_filtered$roundId)) %>%
  arrange(roundId)
#table(pistoldupes$kills)
# 555 rounds
#table(RPS_pistolwins_filtered$kills)
```

Out of the 1422 pistol rounds, 1386 of them (97.5%) involved at least one multi-kill from the winning team.

1347 (97.2%) of the 1386 rounds involved a player achieving 2 kills and 594 (42.8%) rounds with a player achieving 3 or more kills.

Of the 1386 rounds with at least one multi-kill, 831 (60.0%) of them only involved one multi-kill. So, 831 (58.4%) of all 1422 pistol rounds involved a single player achieving a multi-kill.

381 out of 831 (45.8%) sole multi-kill players had 2 kills 450 out of 831 (54.2%) sole multi-kill players had 3 or more kills

In summary:

- 97.5% (1386/1422) of pistol round wins involved at least one multikill from the team that won

- 58.4% (831/1422) of pistol round wins involved only one player achieving a multikill from the team that won

- 31.6% (450/1422) of pistol round wins required a player to solely achieve 3 or more kills to win the round

Analysis

So:

- 40.5% (53/131) of eco round wins required a player to solely achieve 3 or more kills to win the round

- 31.1% (152/488) of light round wins required a player to solely achieve 3 or more kills to win the round

- 28.8% (2968/10297) of gun rounds required a player to solely achieve 3 or more kills to win the round

- 31.6% (450/1422) of pistol rounds required a player to solely achieve 3 or more kills to win the round

8.9% more eco rounds were won by a player getting 3 or more kills than pistol rounds and 11.7% more than gun rounds. This data may indicate that an eco playstyle favoring a "hero buy" or ideas that set up a fragger to get kills leads to more eco wins.

100T Eco

Let's eye test this with the recent Red Bull Homeground Tournament. 100T used an interesting 2nd round eco strategy after losing a pistol.

While 100T were dominant on their pistol rounds, when they did lose their pistol, they opted for a full stinger loadout for their eco. When they used this strategy, they won 3/5 rounds after losing the pistol with all 3 rounds involving at least one multi-kill and 2 of them saw a player achieve 3 kills in the round.

While the game usually goes two wins to one loss after the first three rounds, teams who lose the pistol can take back the next round when another player pops off and gets a multikill. This is fairly rare when most teams opt out of buying after they lose the pistol. But, after seeing 100 Thieves' success with their stinger eco strategy, we may see a change in the way the first three rounds are played by pro teams, creating more variation in tournaments.

Conclusion

So, are eco round wins the result of a "hero player" on the team or is it really a team effort? Although the data points towards the idea of a hero, it's much more complicated when considering how eco rounds are traditionally played. In recent tournaments, multikills have shown to be a factor in eco round success, but it does not appear that teams are purposefully setting a player up to pop off. To me, it looks as if teams like 100 Thieves are changing up the traditional pacing of the game and are taking more of these safe gambles to net an advantage over their opponent. Instead of putting the round in the hand of one player, each player on the team has the potential to be the hero because of the way they set up their eco rounds.