

# Diamond Dollars

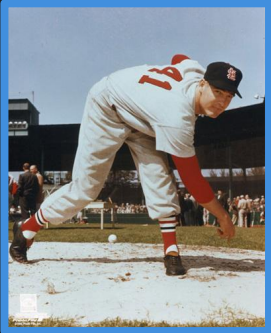
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# Background

- Baseball is a constantly evolving game, and relief pitchers and the way that their performances are quantified have been left in the past
- With the incredible advancements in data that baseball has seen over the last couple of decades, it is well past time to create new ways of valuing bullpen arms
- The *save* stat was invented over 60 years ago, and it is time for baseball to examine the metrics of relief pitcher performances via a 21st century lens



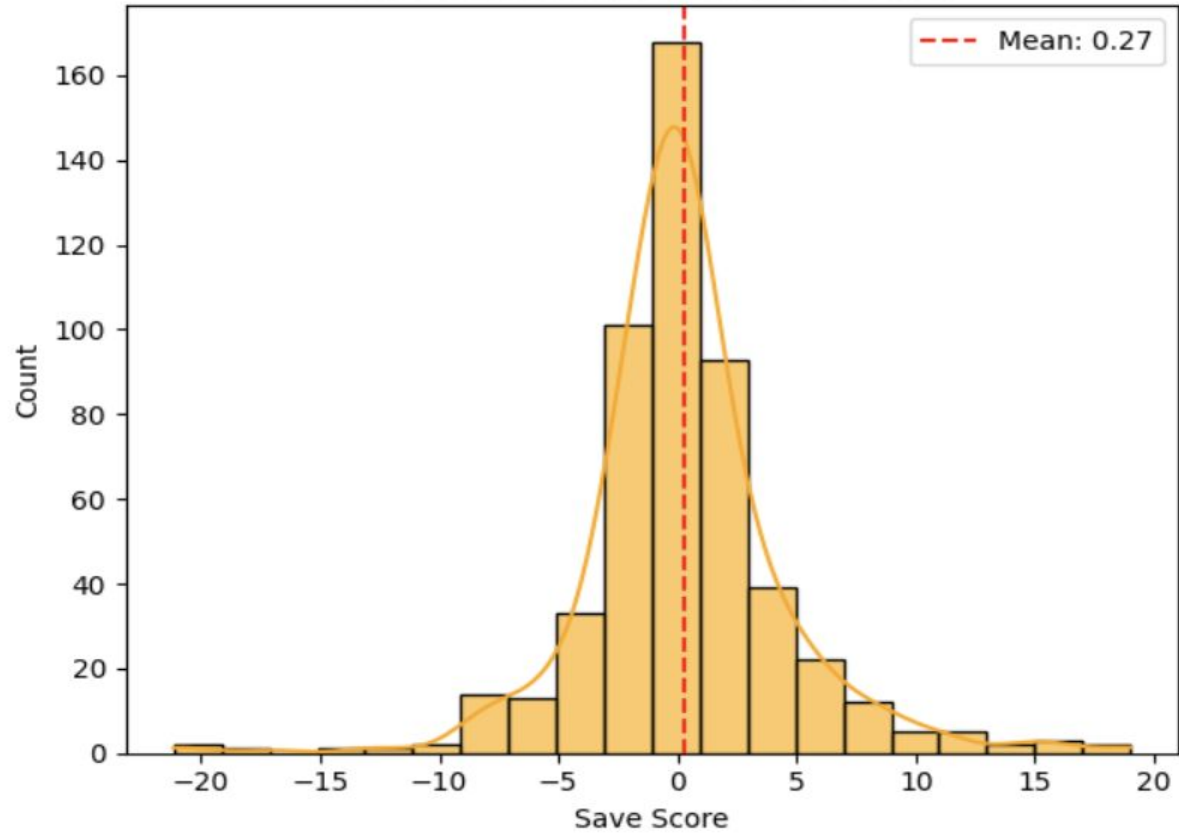
# Process: Building Modern Reliever Metrics

- Data Collection
  - Sources: Baseball-Reference (SV, SVO), FanGraphs (WPA, SIERA), Statcast (xwOBA)
  - Scope: 2023-2024 MLB seasons, ~596 relievers
- Data Cleaning & Merging
  - Standardized names, filtered relievers (IP  $\geq 20$ )
  - Merged into unified dataset with key stats (WPA, K%, leverage\_index)
- Metric Development
  - Save Score:  $(WPA * (1 + IR\_Adjustment) * leverage\_index * Hitter\_Quality * Clutch\_Factor) / SVO$
  - RIS: Linear regression on WPA ( $R^2 = 0.298$ )
- Risks
  - WPA volatility
  - Leverage bias
  - Hitter quality weighting

# Save Score: A Redesigned Look at the Save

- **Save Score Formula:**  $(WPA * (1 + IR\_Adjustment) * leverage\_index * Hitter\_Quality * Clutch\_Factor) / SVO$
- **What it means:** Rewards tougher saves over easy ones
  - WPA: Win Probability Added, measures game impact per pitchers appearance
  - IR\_Adjustment: +0.1 per each stranded inherited runner
  - leverage\_index: Weight for how clutch an appearance is; clutch moments weigh more
  - Hitter\_Quality: woba\_value / 0.320 (average woba), tougher hitters boost score
  - Clutch\_Factor: 1.2 if leverage is > 1.5; if not, then 1.0 is given
  - SVO: Normalized by save opportunities; fairness is distributed across roles

Save Score Distribution (2023-2024)



# Save Score Case Study: Emmanuel Clase

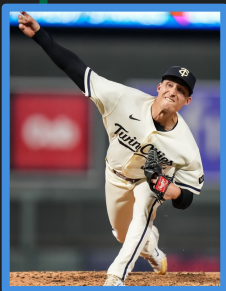


- In 2023, Emmanuel Clase was one of the best relievers in baseball based on saves, with a league leading 44 Saves
- In 2024, Clase had another incredible season, recording 47 saves
- However, according to our Save Score, in 2023 Clase was the 2nd worst closer in baseball, with a Save Score of -1.08
- However, in 2024, he had a top 10 Save Score, recording a score of 2.02
- Although Clase had a much worse ERA in 2023, 3.22 to 0.61, it was still well above average in 2023
- The conclusion is that Clase faltered in 2023 in securing some of his more high leverage saves and it ultimately hurt his Save Score, as our metric takes into account the leverage of each save primarily

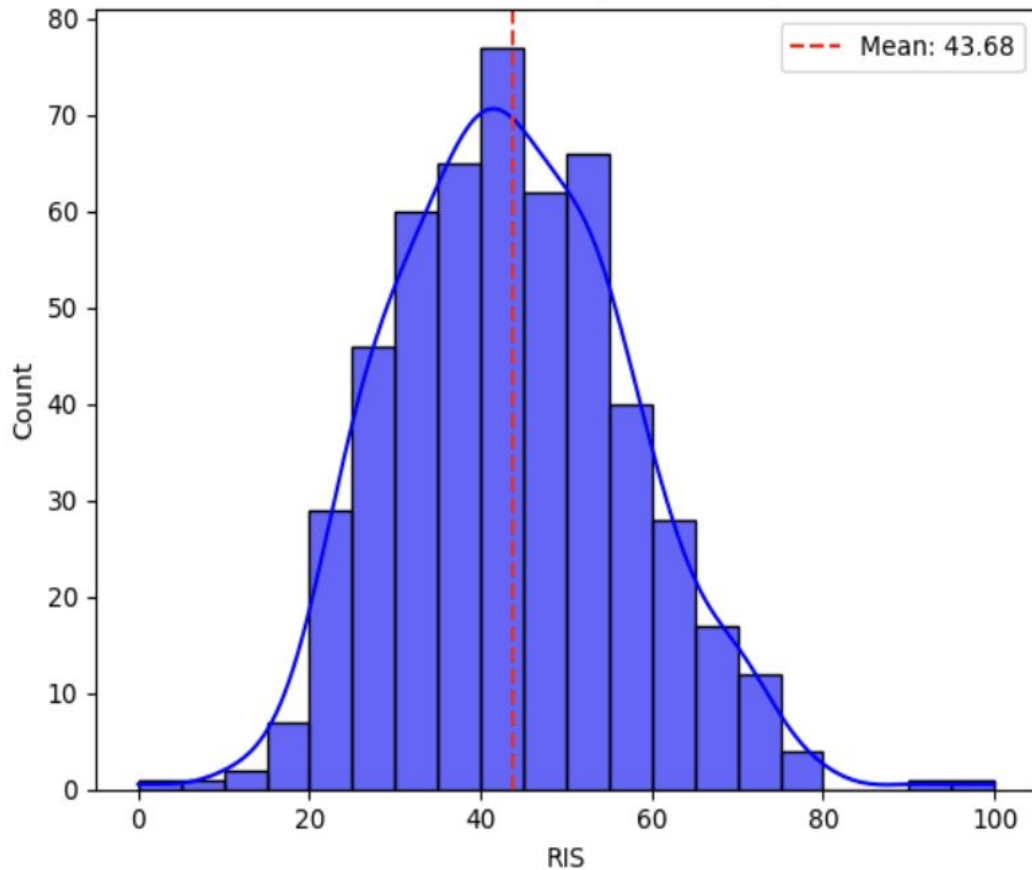


# Reliever Impact Score (RIS)

- Formula:  $(0.372 * \text{SIERA}^{-1}) + (0.049 * \text{IRS\_Success}) + (0.145 * \text{K}\%) + (0.101 * \text{BB}\%) + (0.041 * \text{leverage\_index}) + (0.292 * \text{xwOBA})$  (scaled 0-100)
- Linear Regression on WPA performed to assign weights
- What it means: Predicts impact from skill, optimized to WPA ( $R^2 = 0.29$ )
  - $\text{SIERA}^{-1}$ : Inverse Skill-Interactive ERA, lower ERA equals higher skill (0.372 weight)
  - $\text{IRS\_Success}$ :  $1 - (\text{IRS}/\text{IR})$ , stranding runners matters (0.049 weight)
  - $\text{K}\%$ : Strikeout rate, shows pitchers dominance (0.145 weight)
  - $\text{BB}\%$ : Walk rate, control is a small factor (0.101 weight)
  - $\text{leverage\_index}$ : Situational importance, clutch gene counts (0.041 weight)
  - $\text{xwOBA}$ : Expected weighted on-base average, captures pitcher effectiveness beyond outcomes (0.292 weight)



RIS Distribution (2023-2024)

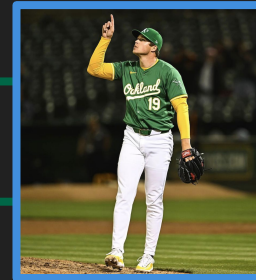


## Predictive Power

- In-Season correlation with WPA (2023-2024) : 0.516 for SV vs. 0.567 for RIS - strong fit
- Predictive correlation (2023 RIS vs. 2024 WPA): 0.380 - dominates SV vs WPA (-0.045)
- $R^2$  vs WPA: 0.299 - skill metrics explain impact
- RIS forecasts value beyond traditional stats



# Reliever Impact Score Case Study: Mason Miller



- 2024: RIS 91.02, highest in MLB, 65 IP, 28 SV
- Why? Elite xwOBA (0.292 weight), K% (0.145), low SIERA, pure skill
- Compare: Tanner Scott 2023 - RIS 71.66 (4th), Save Score 6.69 (1st)
- RIS Predicts: 2023 to 2024 WPA correlation 0.38, proof that skill matters



## 2023 MLB Season

### RIS (all Relievers):

1: Aroldis Chapman - 79.25

2: Devin Williams - 79.16

3: Pete Fairbanks - 73.14

4: Tanner Scott - 71.66

5: Ryan Helsley - 69.69

### Save Score (only Closers): SV/SVO

1: Tanner Scott - 6.69: 12/16

2: Devin Williams - 3.00: 36/40

3: David Bednar - 2.37: 39/42

4: Jordan Romano - 2.24: 36/40

5: Adbert Alzolay - 2.17: 22/25

# 2024 MLB Season

## RIS (all Relievers)

- 1: Mason Miller - 91.02
- 2: Griffin Jax - 76.68
- 3: Cade Smith - 76.55
- 4: David Robertson - 73.10
- 5: Jeff Hoffman - 72.67

## Save Score (only Closers): SV/SVO

- 1: Tanner Scott - 3.13: 22/24
- 2: Trevor Megill - 2.76: 21/24
- 3: Griffin Jax - 2.44: 10/16
- 4: Kenley Jansen - 2.36: 27/31
- 5: Kirby Yates - 2.23: 33/34

# Over/Under Appreciated Closers in 2023

## Over Appreciated:

**1: Emmanuel Clase - 44/56 Saves (78.6%)**

-1.11 Save Score + -97.57 Appreciation Score

**2: Camilo Doval - 39/47 Saves (82.9%)**

0.73 Save Score + -52.56 Appreciation Score

**3: Ryan Pressley - 31/37 Saves (83.8%)**

0.01 Save Score + -37.25 Appreciation Score

## Under Appreciated:

**1: Tanner Scott - 12/16 Saves (75%)**

6.69 Save Score + 97.56 Appreciation Score

**2: Scott Barlow - 13/16 Saves (81.3%)**

1.64 Save Score + 34.41 Appreciation Score

**3: Hunter Harvey - 10/15 Saves (66.7%)**

1.39 Save Score + 33.73 Appreciation Score

# Over/Under Appreciated Closers in 2024

## Over Appreciated:

1. **Clay Holmes - 30/43 Saves (69.7%)**

-1.26 Save Score + -62.16 Appreciation Score

2. **Craig Kimbrel - 23/29 Saves (86.9%)**

-1.84 Save Score + -36.84 Appreciation Score

3. **David Bednar - 23/30 Saves (76.6%)**

-1.60 Save Score + -34.69 Appreciation Score

## Under Appreciated:

1. **Griffin Jax - 10/16 Saves (62.5%)**

2.44 Save Score + 83.44 Appreciation Score

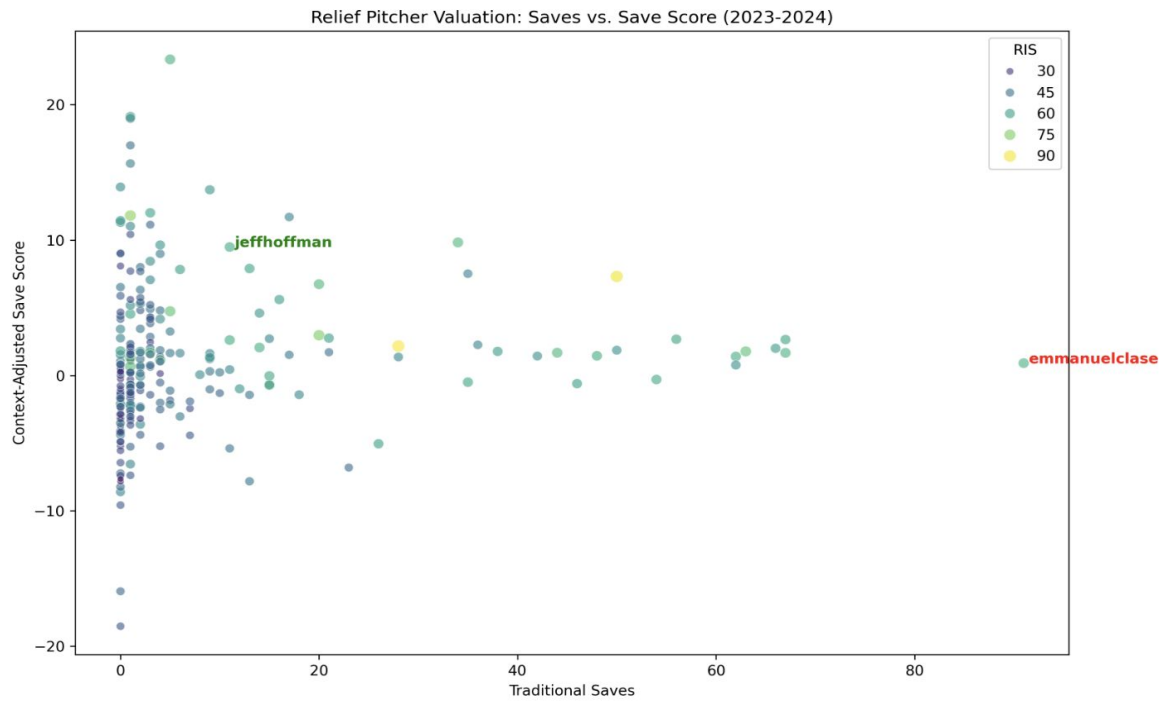
2. **Tanner Scott - 22/24 Saves (91.6%)**

3.13 Save Score + 76.32 Appreciation Score

3. **Trevor Megill - 21/24 Saves (87.5%)**

2.76 Save Score + 68.78 Appreciation Score

# Big Picture



# Conclusion

- Process
  - A desire to go beyond conventional save and ERA metrics and concentrate on game impact, leverage, and genuine relief value led to the creation of Save Score and Reliever Impact Score (RIS)
  - Created a model that incentivizes more difficult saves and clutch performances
- Devil's Advocate
  - Overweighting situation factors (Clutch and Leverage)
  - Shortcomings of WPA as a performance metric
  - Bias in hitter quality weighting

# Conclusion Continued

- Findings
  - RIS & Save Score matter!
  - Advanced pressure sabermetrics can win championships
- In conclusion
  - MLB Front Offices are constantly looking for a competitive advantage
  - By understanding how to value relief pitchers in ways that other organizations do not, they can better allocate resources to pay relievers their true value

