# US Chess Ratings Workshop

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# Discussion topics for this workshop:

- Annual rating monitoring analysis
- Rating variance measure
- Updating the FIDE $\rightarrow$ USCF conversion

# Mean ratings of "stable" players over time:

- Active in the current and previous 3 years.
- Age between 35-45 years old.
- Established rating in all four years.

Goal is to maintain rating levels roughly to where they were in 1997.

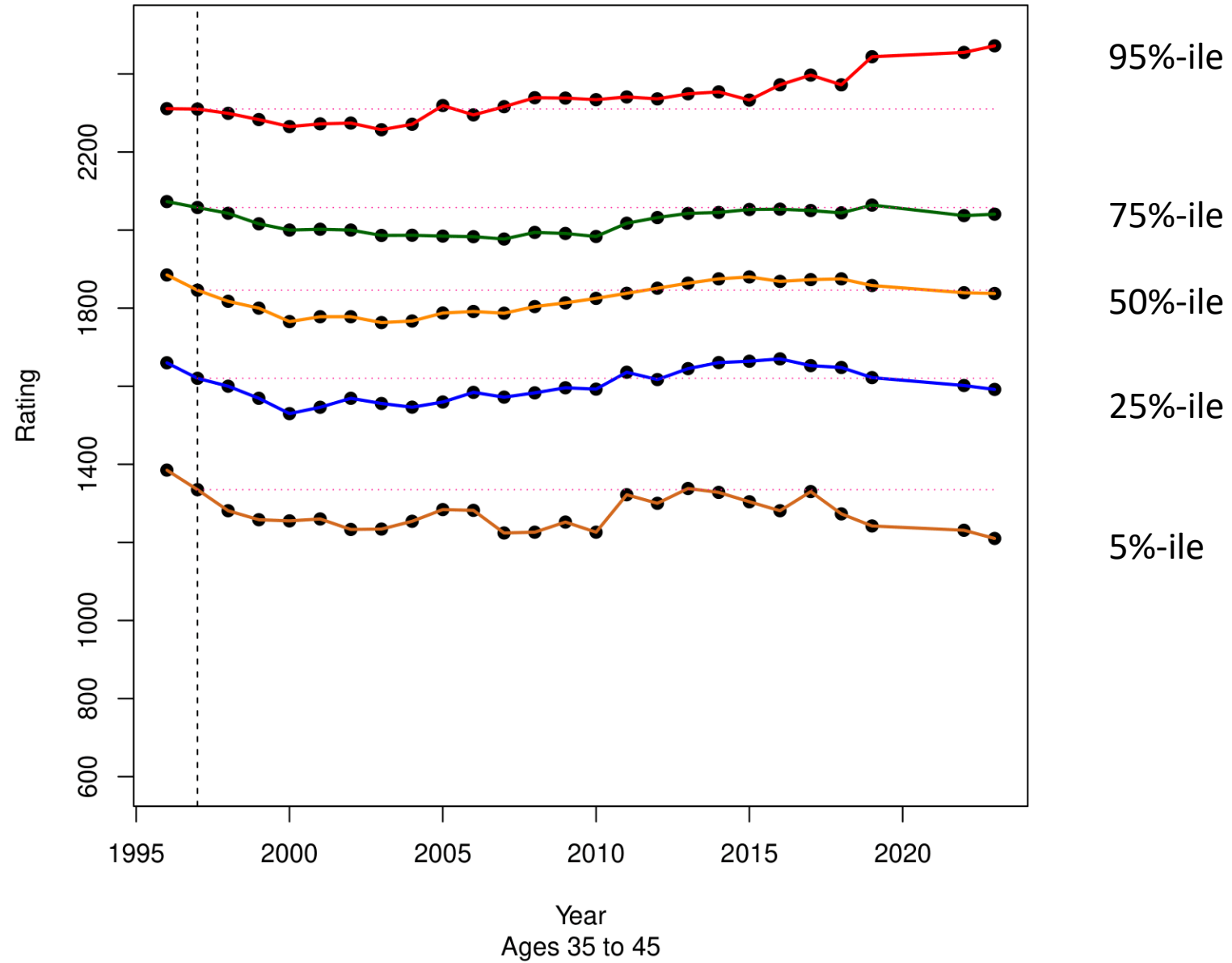| Year | Mean | N |
|------|------|------|
| 1996 | 1862 | 1673 |
| 1997 | 1836 | 1578 |
| 1998 | 1815 | 1730 |
| 1999 | 1793 | 1542 |
| 2000 | 1767 | 1372 |
| 2001 | 1775 | 1213 |
| 2002 | 1776 | 1108 |
| 2003 | 1764 | 988 |
| 2004 | 1766 | 866 |
| 2005 | 1782 | 782 |
| 2006 | 1785 | 814 |
| 2007 | 1776 | 831 |
| 2008 | 1785 | 769 |
| 2009 | 1799 | 728 |
| 2010 | 1795 | 675 |
| 2011 | 1828 | 640 |
| 2012 | 1833 | 621 |
| 2013 | 1848 | 642 |
| 2014 | 1853 | 659 |
| 2015 | 1853 | 678 |
| 2016 | 1857 | 666 |
| 2017 | 1861 | 670 |
| 2018 | 1844 | 717 |
| 2019 | 1844 | 710 |
| 2022 | 1825 | 644 |
| 2023 | 1818 | 630 |

Ratings continue to deflate.

The RC voted last year to lower the bonus point threshold by 2 points to 12. No recommendation for further changes at this point.
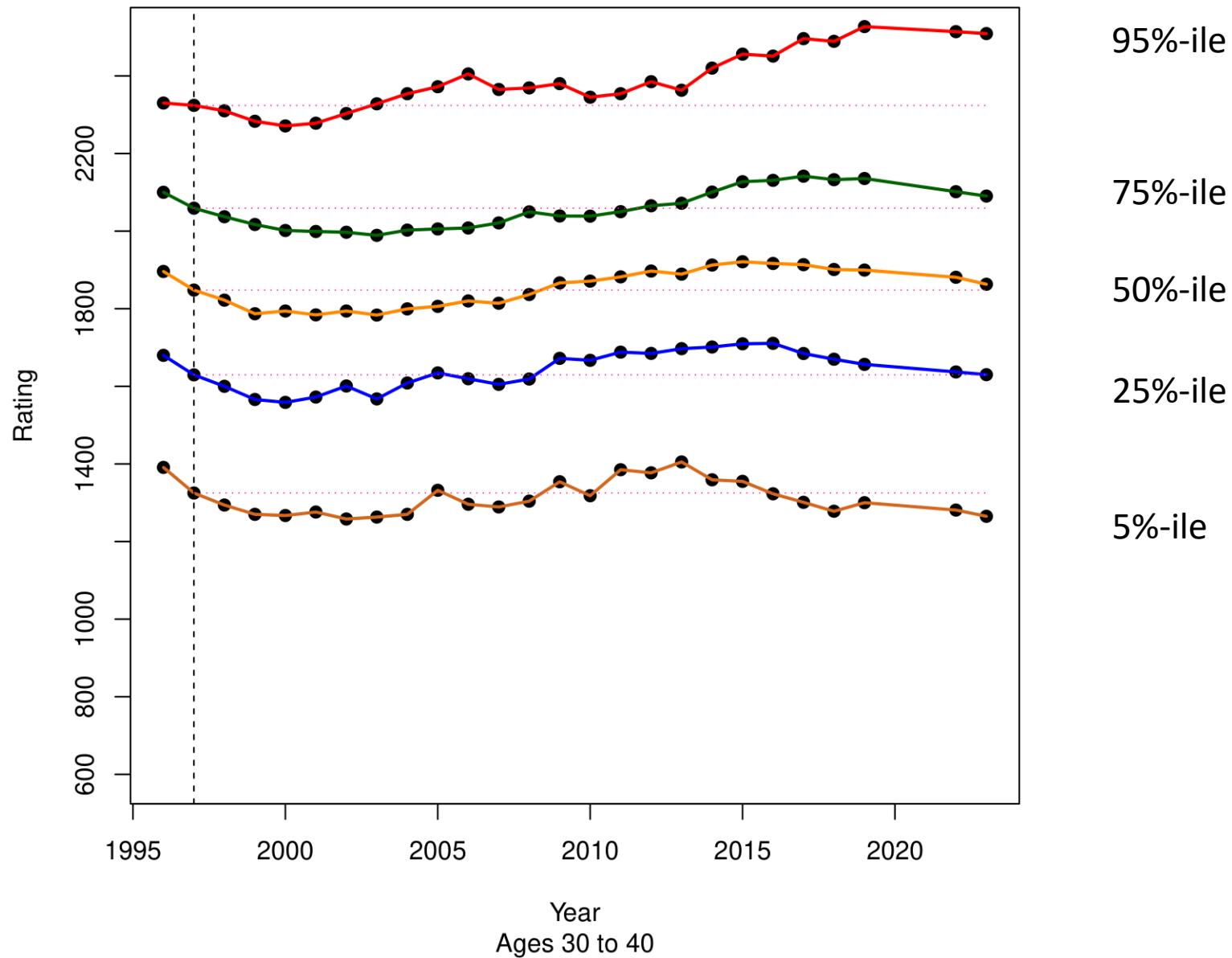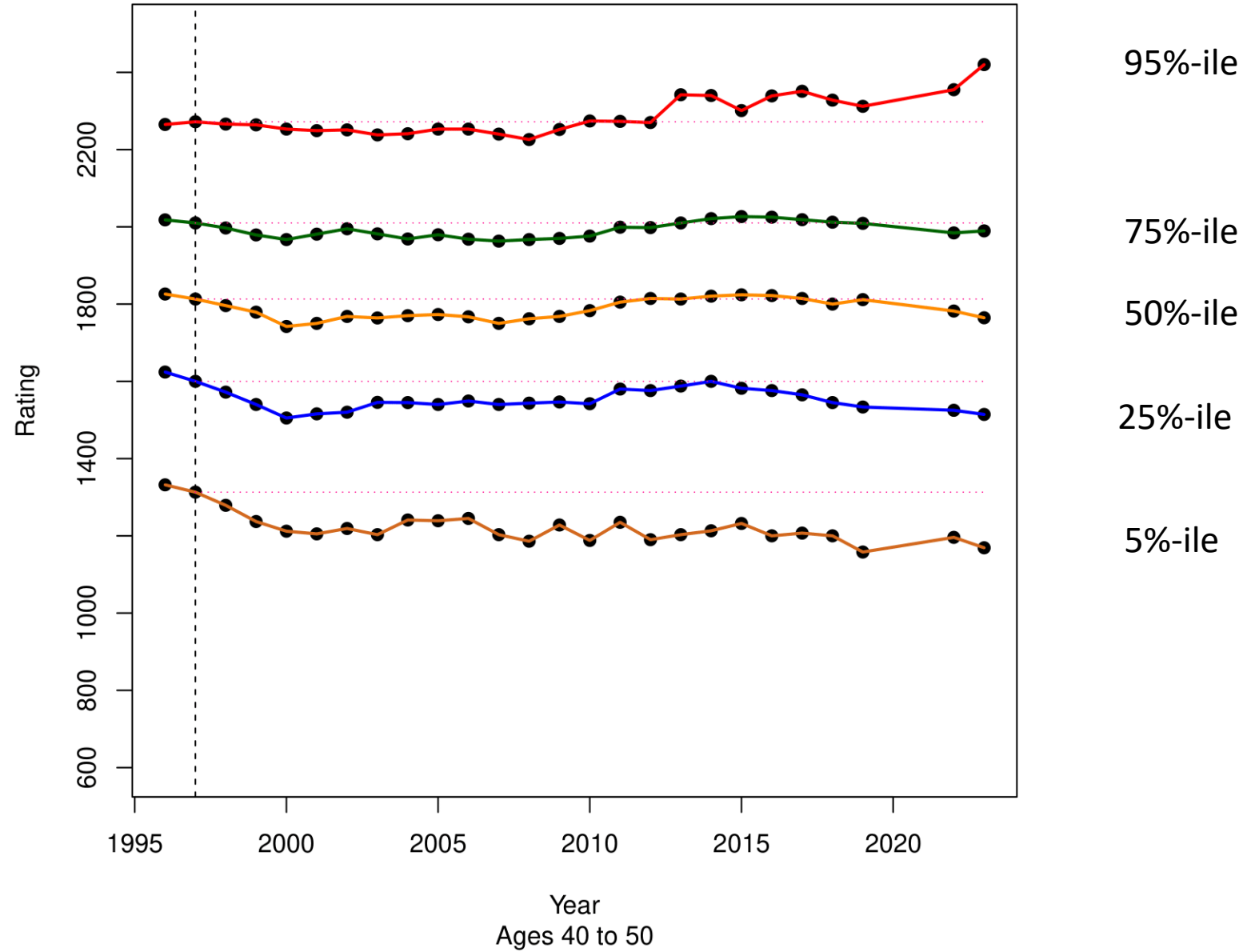
Distribution of USCF Established Ratings
Active at Least 5 Years

**Distribution of USCF Established Ratings**
**Active at Least 5 Years**

95%-ile

75%-ile

50%-ile

25%-ile

5%-ile

Rating

Year
Ages 35 to 45

**Distribution of USCF Established Ratings**
**Active at Least 5 Years**

95%-ile

75%-ile

50%-ile

25%-ile

5%-ile

Rating

Year
Ages 40 to 50

# Rating floor analysis:

- Without rating floors, we would expect approximately 1% of players with established ratings to have a rating ending in "00" (e.g., 1500, 1800, etc.).

- The actual percentage of players at ratings ending with "00" is an indication of how much rating floors distort established ratings.

**Percentage of active players with established ratings between 1400–2199 ending in 00**
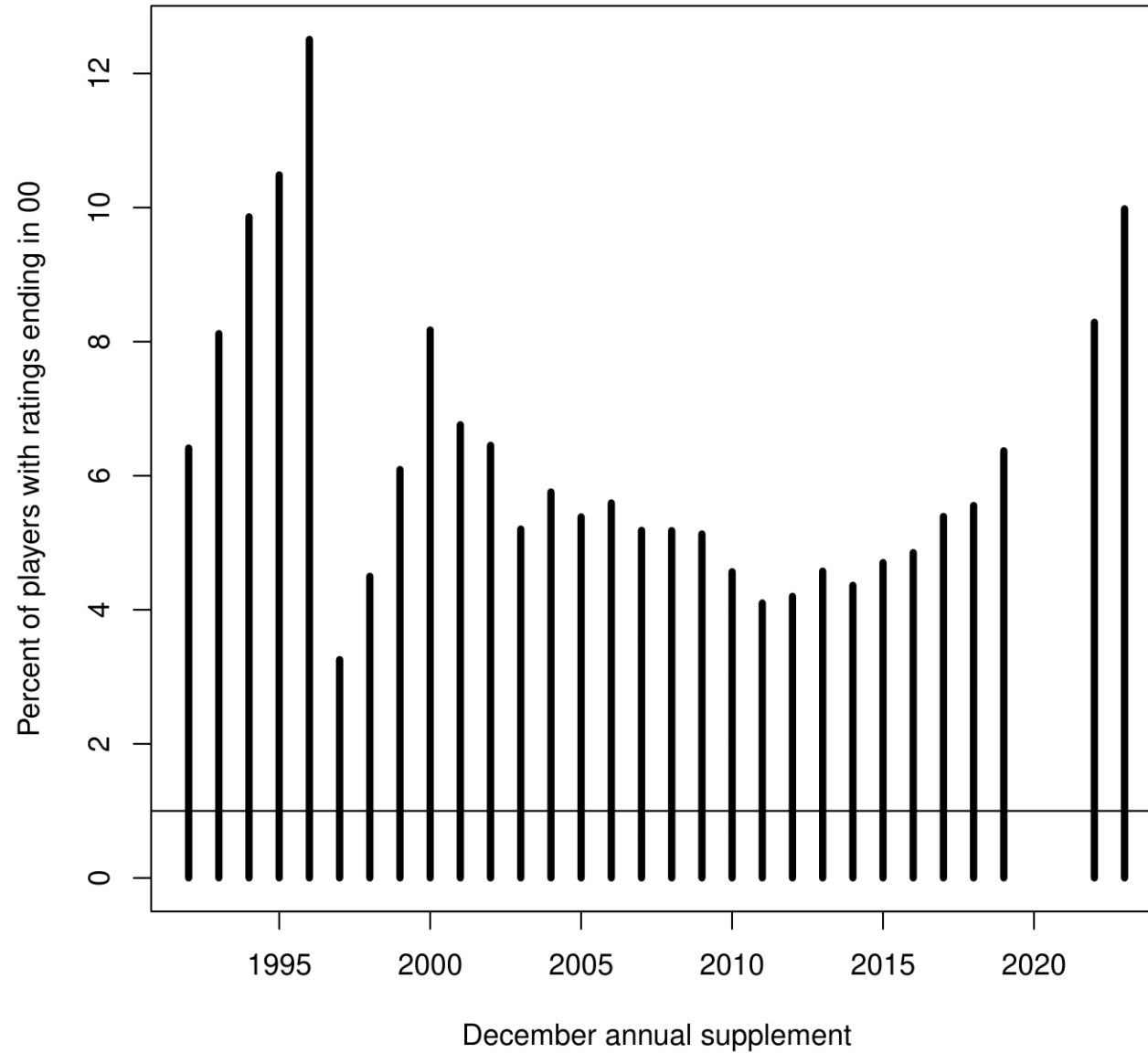
**Percentage of active players with established ratings between 1200–1399 ending in 00**
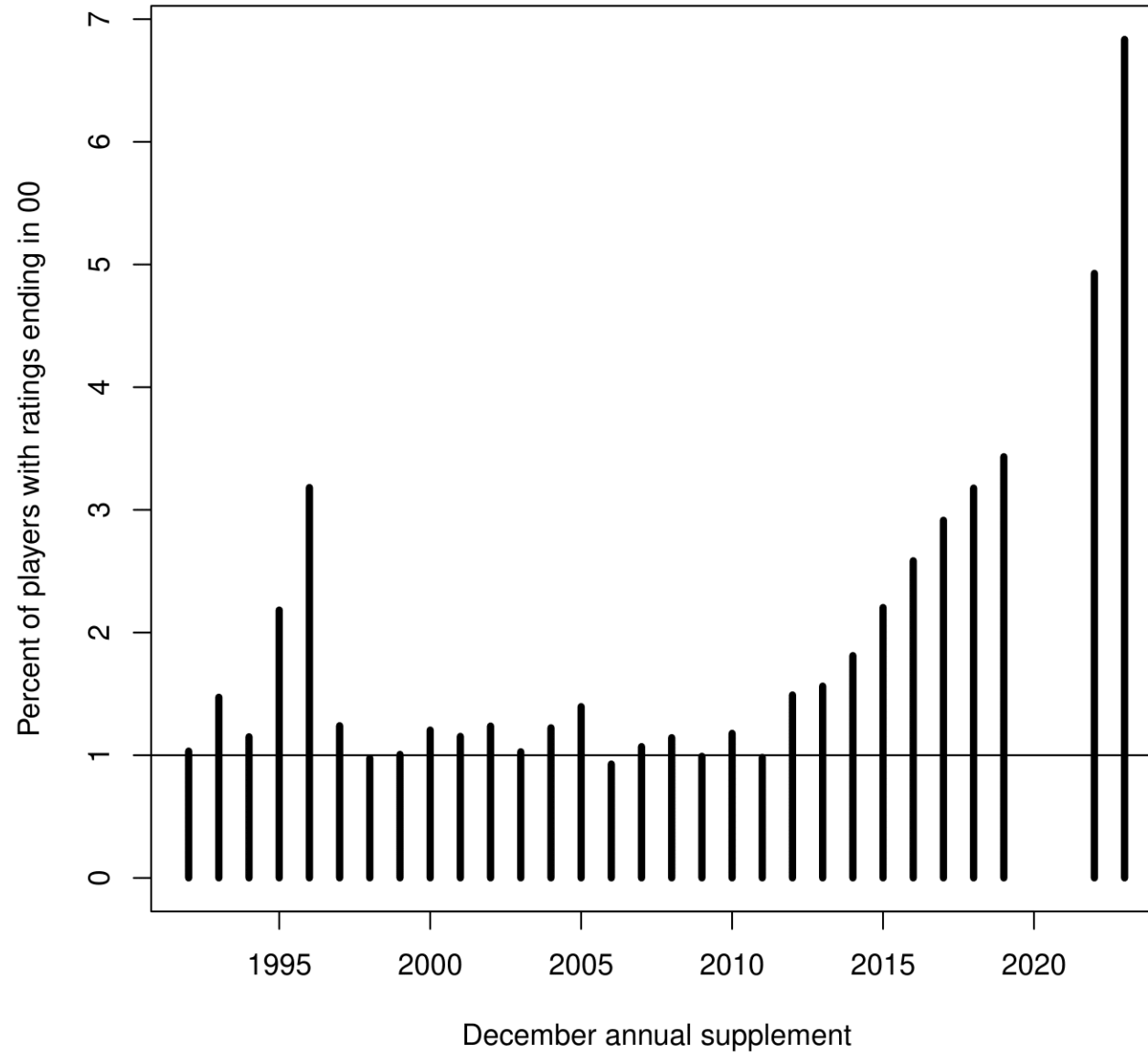
# Ratings variance measure

Key idea:

- In addition to a rating, each player would obtain a measure of how much their strength is expected to vary.

- This measure might help TDs decide whether it is unfair to place players with high "variances" in low-rated sections, for example.

# Ratings variance:

<u>Some background</u>:

- US Chess expressed interest in a variance measure dating back to 2016.  In 2018 the ratings committee was charged with developing a measure.

- After several postponements in the work, a measure was developed and proposed this year.

- The proposal was submitted to the EB on February 24, 2024.

# Ratings variance:

Basic intuition behind the approach:

- Collect all the game outcomes for a player over the previous 3 years.

- For each tournament, compute a tournament performance rating (the rating at which the expected score equals the total observed score) using opponents' post-event ratings.

- Compute a measure of the variation in performance ratings, weighted by the recency of the tournament and by the number of games played in the tournament.

# Ratings variance measure: Example

Suppose a player has competed in 8 tournaments in the last 3 years.

The following are the dates, game outcomes, and performance ratings for each tournament.

# Ratings variance measure: Example

Tournament 1:
30 days ago (June 18, 2024)

Tournament 2:
90 days ago (April 19, 2024)

```
Opponent_Rating Score
          1700    1.0
          1800    0.5
          1850    1.0
          1900    0.0
          1750    0.5

Performance rating:
1873
```

```
Opponent_Rating Score
          2100    0.0
          1900    0.5
          1950    0.5
          2000    0.0

Performance rating:
1789
```

# Ratings variance measure: Example

Tournament 3:
150 days ago (Feb 19, 2024)

```
Opponent_Rating Score
            1800    0.5
            1850    0.5
            1825    1.0

Performance rating:
1946
```

Tournament 4:
210 days ago (Dec 21, 2023)

```
Opponent_Rating Score
            1750    1.0
            1800    1.0
            1850    0.0
            1725    0.5

Performance rating:
1872
```

# Ratings variance measure: Example

## Tournament 5:
## 280 days ago (Oct 12, 2023)

```
Opponent_Rating Score
           1630    0.5
           2070    0.0
           1815    0.5
           1840    1.0

Performance rating:
1837
```

## Tournament 6:
## 370 days ago (July 14, 2023)

```
Opponent_Rating Score
           1620    0.5
           1960    1.0
           1520    0.5
           1750    0.0

Performance rating:
1708
```

# Ratings variance measure: Example

## Tournament 7:
## 450 days ago (Apr 25, 2023)

```
Opponent_Rating Score
           1790    0.0
           1560    1.0
           1820    1.0
           1540    1.0
           2050    0.5


Performance rating:
1935
```
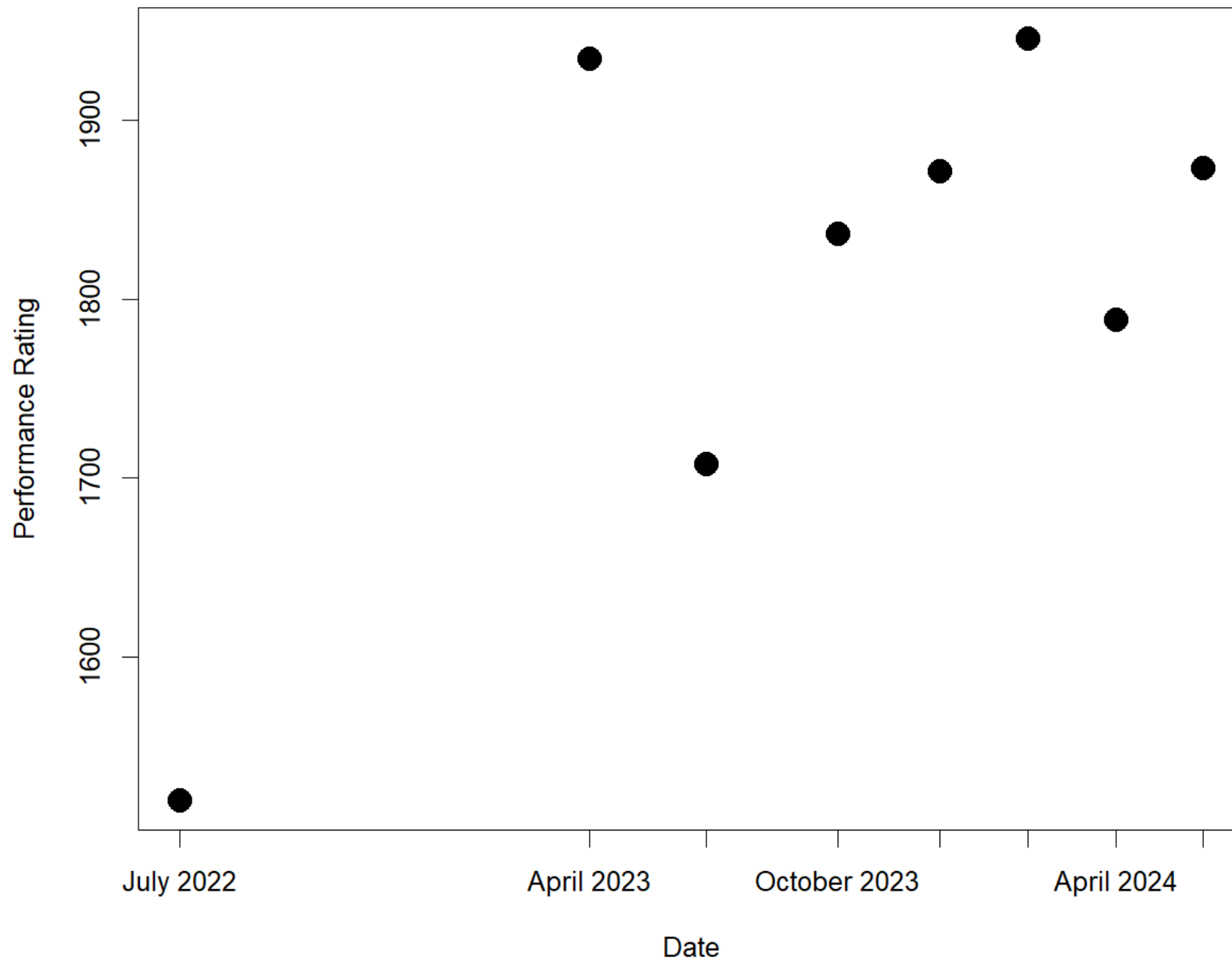
## Tournament 8:
## 730 days ago (July 19, 2022)

```
Opponent_Rating Score
           1520    1.0
           1560    0.0
           1515    0.5
           2020    0.5
           1550    0.0
           2070    0.0

Performance rating:
1520
```
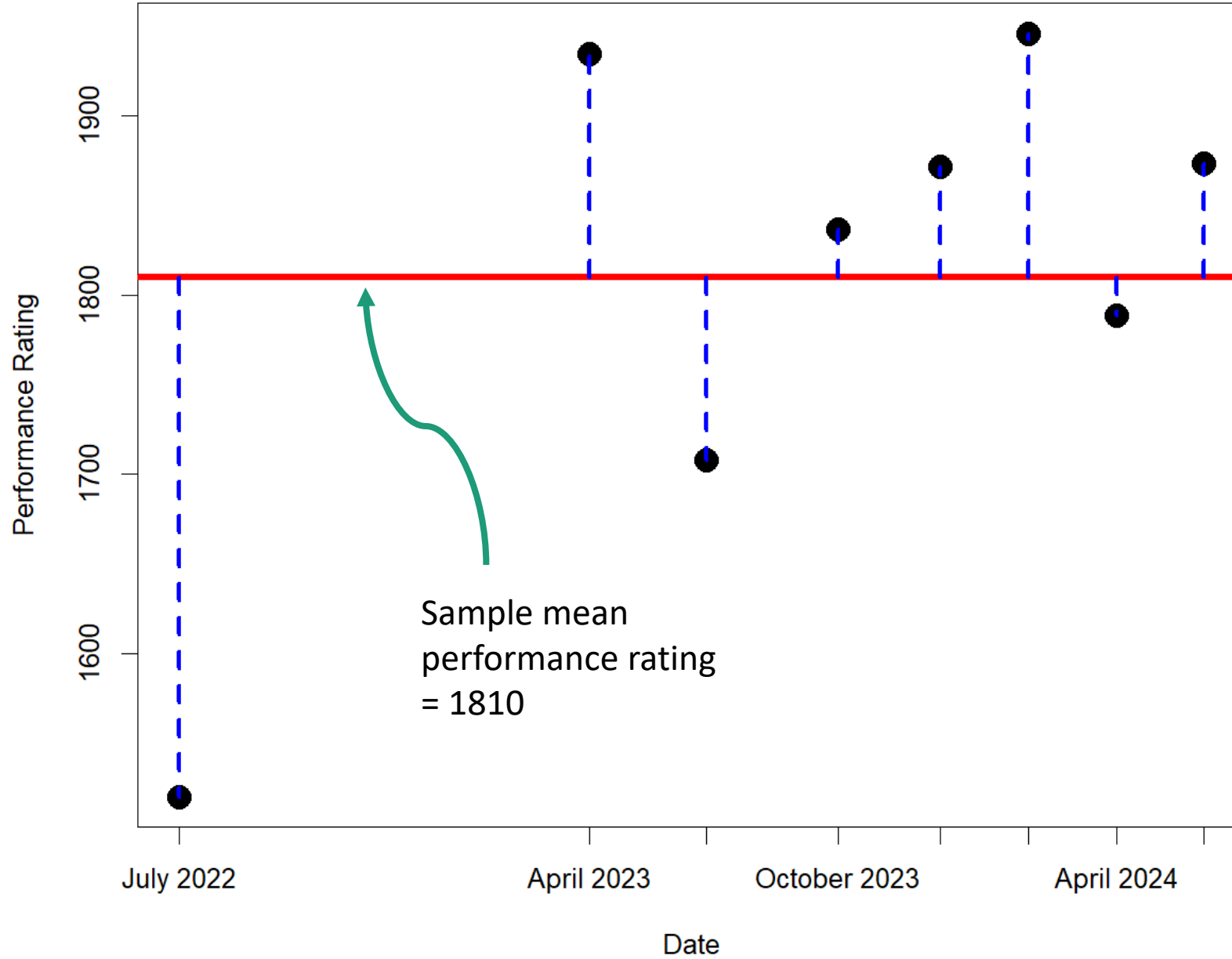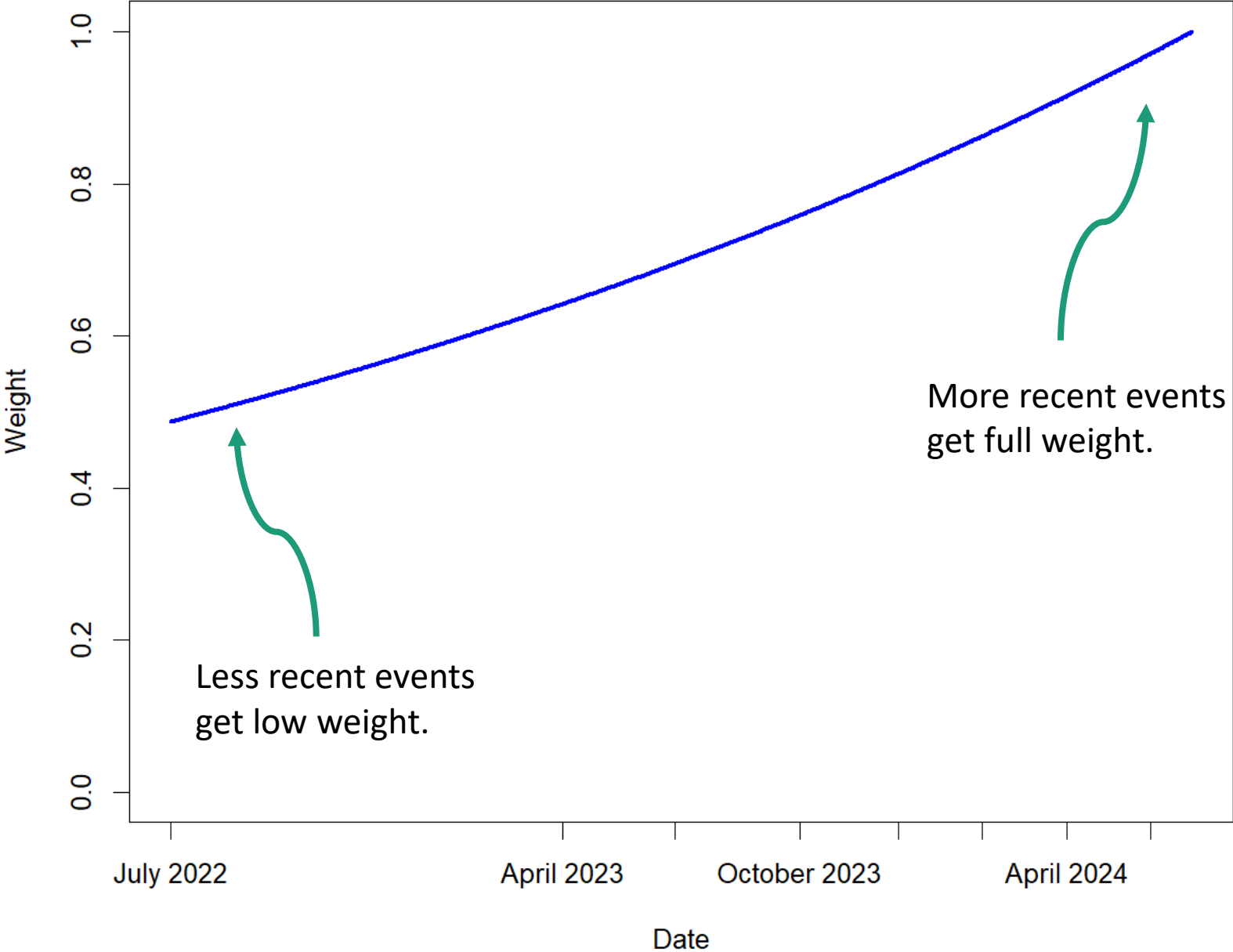
**Performance ratings over time**
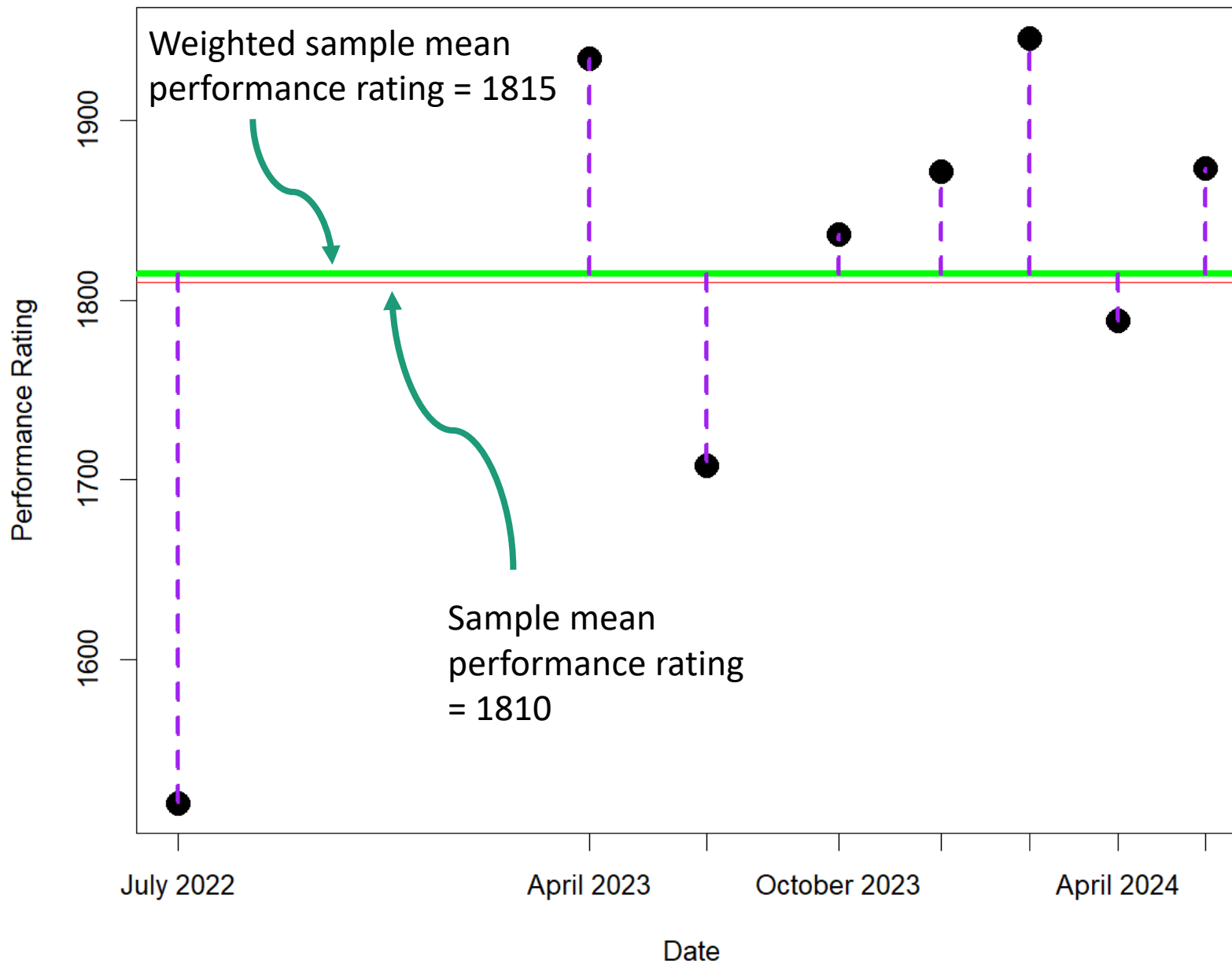
Performance ratings range from 1520 to 1946.

Performance Rating

Date

July 2022     April 2023     October 2023     April 2024

Performance ratings over time

Weights as a function of time

Performance ratings over time

# Ratings variance measure: Example

Weighted standard deviation is computed to be 133.5.

A (symmetric) 90% confidence interval for the player's strength is $1815 \pm 1.645(133.5) = (1595, 2035)$.

Based on the 5<sup>th</sup> and 95<sup>th</sup> percentiles of the performance rating distribution, the (asymmetric) 90% confidence interval is $(1736, 1942)$.

# Ratings variance measure:

Next steps:

- Need to implement approach on US Chess testbed server to examine distribution of variance measure
- Decision for level of confidence percentage to implement
- How will variance measure be used – need to discuss with TDC and Rules committees
- Dissemination of measure
- Possible Chess Life article

# FIDE $\rightarrow$ USCF conversion :

## Role of FIDE ratings in US Chess rating system:

- Assigning initial US Chess ratings to players without a US Chess rating but with a FIDE rating.

- Updating US Chess ratings for those competing in FIDE events not run by US Chess.

Both functions require a conversion formula that is currently in the rating system specifications.

# FIDE $\rightarrow$ USCF conversion :

- On March 1, 2024, FIDE implemented significant changes to their rating system.

- This included a one-time increase for all ratings below 2000, calculated using the formula:

Revised FIDE Rating $=$

$\qquad$ Old FIDE Rating $+ 0.4 \times (2000 -$ Old FIDE Rating$)$

# FIDE → USCF conversion :

Revised FIDE Rating =

    Old FIDE Rating + $0.4 \times (2000 - $ Old FIDE Rating$)$

Example changes:

| Old FIDE Rating | Revised FIDE rating |
|---|---|
| 1200 | 1520 |
| 1400 | 1640 |
| 1800 | 1880 |
| 2000 | 2000 |

# FIDE → USCF conversion :

To accommodate the change in FIDE ratings, the Ratings Committee updated the conversion formula, effective March 1, 2024, as follows:

For FIDE ratings $\leq$ 2000: USChess $= 932 + 0.564 \times$ FIDE

For FIDE ratings $>$ 2000: USChess $= 20 + 1.02 \times$ FIDE

# FIDE → USCF conversion :

Additionally, a separate conversion formula previously used for FIDE youth events has been updated to:

For FIDE ratings $\leq 2000$: USChess $= 1168 + 0.456 \times$ FIDE

For FIDE ratings $> 2000$: USChess $= 80 + 1.0 \times$ FIDE

These updates have been integrated into the rating system specifications, available on the US Chess website.

# Thank you!