MEASURING QUARTERBACK EFFICIENCY

Creation of the Passer Efficiency Score

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Existing Problems
The existing Passer Rating, unchanged since 1973, has flaws that undermine value. The statistic has a maximum value of 158.3, which creates an artificial ceiling on productivity, as well as an illusion for quarterback performance to be closer than it is. In addition to the closeness illusion, the ceiling also allows for a Perfect Game to be accomplished without being perfect.

Passer Efficiency Score
The Passer Efficiency Score is a statistic that measures the efficiency and productivity of the passer. In the statistic, the following assumptions are made: the value of a turnover from The Hidden Game of Football® stand true, all incompletions are blamed on the quarterback, and all quarterbacks play against the same level of competition.

The PES has two components:
Yard Component and Score Component

Yard Component
The Yard Component measures the production of a passer through total yards gained, subtracted by the estimated yards lost.

(Sum of Yards – Incompletions * Yards per Attempt)

Score Component
The Score Component measures the production of a passer through points scored by passing touchdowns, subtracted by the estimated points lost by interceptions.

(Touchdowns * 6 – Interceptions * 4)

The Passer Efficiency Score is calculated by multiplying the Yard Component and Score Component. The resulting number created is the non-adjusted value of quarterback production.

(YDS-INC*Y/A) * (TD*6-INT*4)

Normalization
To make the resulting PES easier to read and compare, the raw number was normalized using the STANDARDIZE function in Microsoft Excel. The result is a corresponding z-score to their PES.

Two Z-Scores were calculated:
• Z-Score Total is normalized to every quarterback’s score since 1973
• Z-Score Year is normalized to every quarterback’s score in that specific season

Most Productive Seasons

Most Productive Seasons Normalized to Year

References
1. All data downloaded from Pro-Football-Reference.com
2. Source: https://emergentmath.files.wordpress.com/2011/02/eq15.png