

Appendix

PER Calculation

1. First unadjusted PER (uPER) is calculated

$$\begin{aligned} \text{uPER} = & (1 / \text{MP}) * \\ & [3P \\ & + (2/3) * \text{AST} \\ & + (2 - \text{factor} * (\text{team_AST} / \text{team_FG})) * \text{FG} \\ & + (\text{FT} * 0.5 * (1 + (1 - (\text{team_AST} / \text{team_FG})) + (2/3) * (\text{team_AST} / \text{team_FG}))) \\ & - \text{VOP} * \text{TOV} \\ & - \text{VOP} * \text{DRB\%} * (\text{FGA} - \text{FG}) \\ & - \text{VOP} * 0.44 * (0.44 + (0.56 * \text{DRB\%})) * (\text{FTA} - \text{FT}) \\ & + \text{VOP} * (1 - \text{DRB\%}) * (\text{TRB} - \text{ORB}) \\ & + \text{VOP} * \text{DRB\%} * \text{ORB} \\ & + \text{VOP} * \text{STL} \\ & + \text{VOP} * \text{DRB\%} * \text{BLK} \\ & - \text{PF} * ((\text{lg_FT} / \text{lg_PF}) - 0.44 * (\text{lg_FTA} / \text{lg_PF}) * \text{VOP})] \end{aligned}$$

With

- *tm*, the prefix, indicating of team rather than of player;
- *lg*, the prefix, indicating of league rather than of player;
- *min* for number of minutes played;
- *3P* for number of three-point field goals made;
- *FG* for number of field goals made;
- *FT* for number of free throws made;
- *VOP* for value of possession (but in reference to the league, in this instance);
- *RB* for number of rebounds: *ORB* for offensive, *DRB* for defensive, *TRB* for (total) combined, *RBP* for percentage of offensive or defensive;

2. Once uPER is calculated, it must be adjusted for team pace and normalized to the league to become PER:

$$\text{aPER} = (\text{pace adjustment}) * \text{uPER}$$

$$\text{With pace adjustment} = \text{lg_Pace} / \text{team_Pace}$$

3. The final step is to standardize aPER. First, calculate league average aPER (lg_aPER) using player minutes played as the weights. Then, do the following:

$$\text{PER} = \text{aPER} * (15 / \text{lg_aPER})$$