Broker Performance Rating (BPR) A Comprehensive Skill Metric for War Brokers

Did You Get Sniped?

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Abstract

The Broker Performance Rating (BPR) is a mathematical formula designed to accurately determine a player's skill level in the video game War Brokers. This metric moves beyond simple statistics to capture true skill and contribution by evaluating combat effectiveness, game impact, resilience, and experience. The formula employs a multiplicative structure that requires players to excel in multiple dimensions simultaneously, preventing any single metric from dominating the overall assessment.

1 Introduction

The Broker Performance Rating (BPR) provides a comprehensive measurement of player effectiveness in War Brokers. Traditional metrics such as Kill/Death ratio, total kills, Kills ELO, and Games ELO often fail to capture the full scope of a player's contribution to the game when considered in isolation. BPR addresses this limitation by integrating multiple performance dimensions into a single, interpretable score that weights and combines these metrics in a meaningful way.

The formula combines two primary components: a **Core Performance Score** and an **Experience Bonus**, multiplied by 100 for scale. The Core Performance Score is calculated as the square root of *Factor A* (Combat Effectiveness) times *Factor B* (Game Impact & Resilience). Factor A evaluates combat prowess through a damage-weighted K/D ratio and a kills ELO bonus, while Factor B assesses sustained contribution through average damage per game, games ELO bonus, and resilience (damage absorbed per legitimate death, excluding self-destructs). The Experience Bonus adds a minor supplementary score based on total XP. This multiplicative structure ensures players must excel in both combat skills and game impact to achieve high ratings, with the geometric mean preventing any single metric from dominating the overall score.

2 Mathematical Formulation

2.1 Overall Performance Score

$$\text{BPR} = (\text{Core Performance Score} + \text{Experience Bonus}) \times 100 \tag{1}$$

$$\text{Core Performance Score} = \sqrt{\text{Factor A} \times \text{Factor B}} \tag{2}$$

2.2 Factor A: Combat Effectiveness

Factor A quantifies a player's direct combat skill, combining their damage-weighted K/D ratio with an ELO-based ranking bonus for kills.

$$\text{Factor A} = \sqrt{\text{Combat Efficiency}} + \text{Kills ELO Bonus} \tag{3}$$

2.2.1 Combat Efficiency

The Combat Efficiency metric goes beyond a simple Kill/Death ratio by deeply integrating damage numbers. It rewards players who not only secure kills but also contribute significantly to damage output efficiently.

$$\text{Combat Efficiency} = \frac{\text{total\_kills} \times \text{damage\_dealt}}{\text{total\_deaths} \times \text{damage\_received}} \tag{4}$$

2.2.2 Kills ELO Bonus

This component provides a significant boost to players with high rank (small "Top %" value) in kills ELO. The inverse relationship is heavily dampened by a fourth root to provide a powerful but controlled bonus for elite players.

$$\text{Kills ELO Bonus} = \frac{\left(\frac{1}{\text{kills\_elo\_rank}}\right)^{1/4}}{6.2} \tag{5}$$

where $\text{kills\_elo\_rank} = \frac{\text{kills\_elo\_top\_\%}}{100}$

2.3 Factor B: Game Impact & Resilience

Factor B assesses a player's sustained contribution, longevity, and ability to absorb damage before falling in combat.

$$\text{Factor B} = \text{Avg Damage Impact} + \text{Games ELO Bonus} + \text{Resilience} \tag{6}$$

2.3.1 Average Damage Impact

This metric calculates a player's average damage contribution per game, rewarding consistent high damage dealers.

$$\text{Avg Damage Impact} = \frac{\text{damage\_dealt}}{8250 \times \text{total\_games}} \tag{7}$$

The normalization constant 8250 rebalances the weight within Factor B.

2.3.2 Games ELO Bonus

This component rewards experience and longevity by providing a significant boost to players with high rank in Games ELO.

$$\text{Games ELO Bonus} = \frac{\left(\frac{1}{\text{games\_elo\_rank}}\right)^{1/4}}{13.2} \tag{8}$$

where $\text{games\_elo\_rank} = \frac{\text{games\_elo\_top\_\%}}{100}$

2.3.3 Resilience

Resilience measures the damage absorbed per legitimate death (excluding self-destructs), providing insight into a player's effective survivability.

$$\text{Resilience} = \frac{\text{damage\_received} \times (1 - \text{self\_destruct\_\%})}{660 \times \text{total\_deaths}} \tag{9}$$

where:

$$\text{self\_destruct\_\%} = \frac{\text{num\_self\_destructs}}{\text{total\_deaths}} \tag{10}$$

The normalization constant 660 adjusts weighting in the Factor B structure.

2.4 Experience Bonus

The Experience Bonus provides a supplementary score for total experience points earned, dampened by a fourth root to ensure skill remains the primary driver of the score.

$$\text{Experience Bonus} = \frac{(\text{xp})^{1/4}}{62} \tag{11}$$

3 Sample Calculation

To illustrate the BPR calculation, we present the profile of player **JoJa15** (as of July 27, 2025):

Metric	Value
Total Kills	150,167
Total Damage Dealt	9,515,791
Total Deaths	38,819
Total Damage Received	21,487,962
Kills ELO (Top %)	1.0832%
Games ELO (Top %)	0.1465%
Total Games Played	6,270
Self Destructs	460
Total XP	25,441,015

Table 1: Player statistics for JoJa15

3.1 Step-by-Step Calculation

Step 1: Calculate Self-Destruct Percentage

$$\text{self\_destruct\_\%} = \frac{460}{38,819} = 0.011850 \tag{12}$$

Step 2: Calculate Factor A Components

$$\text{Combat Efficiency} = \frac{150,167 \times 9,515,791}{38,819 \times 21,487,962} = 1.713089 \tag{13}$$

$$\text{kills\_elo\_rank} = \frac{1.0832}{100} = 0.010832 \tag{14}$$

$$\text{Kills ELO Bonus} = \frac{(1/0.010832)^{0.25}}{6.2} = 0.499955 \tag{15}$$

$$\text{Factor A} = \sqrt{1.713089} + 0.499955 = 1.308850 + 0.499955 = 1.808805 \tag{16}$$

Step 3: Calculate Factor B Components

$$\text{Avg Damage Impact} = \frac{9,515,791}{8,250 \times 6,270} = 0.183960 \tag{17}$$

$$\text{games\_elo\_rank} = \frac{0.1465}{100} = 0.001465 \tag{18}$$

$$\text{Games ELO Bonus} = \frac{(1/0.001465)^{0.25}}{13.2} = 0.387228 \tag{19}$$

$$\text{Resilience} = \frac{21,487,962 \times (1 - 0.011850)}{660 \times 38,819} = 0.828762 \tag{20}$$

$$\text{Factor B} = 0.183960 + 0.387228 + 0.828762 = 1.399950 \tag{21}$$

Step 4: Calculate Core Performance Score

$$\text{Core Performance Score} = \sqrt{1.808805 \times 1.399950} = \sqrt{2.531772} = 1.591300 \tag{22}$$

Step 5: Calculate Experience Bonus

$$\text{Experience Bonus} = \frac{(25,441,015)^{0.25}}{62} = \frac{71.228}{62} = 1.145492 \tag{23}$$

Step 6: Calculate Final BPR

$$\text{BPR} = (1.591300 + 1.145492) \times 100 = 2.736792 \times 100 = 273.679 \tag{24}$$

Result

JoJa15's BPR: 273.679

This score reflects a highly skilled player who excels in both combat effectiveness and sustained game impact.

4 Limitations

While BPR provides a comprehensive quantitative assessment, it does not account for intangible factors such as:

- Map knowledge and tactical awareness
- Teamwork and communication skills
- Leadership and strategic decision-making
- Adaptability to different game modes

Squad leaders and evaluators should use BPR as one component of player assessment, complemented by direct observation and playtesting.

5 Conclusion

The Broker Performance Rating offers a rigorous, mathematically-grounded approach to measuring player skill in War Brokers. By combining combat effectiveness, game impact, resilience, and experience through carefully calibrated weights and multiplicative relationships, BPR captures the multidimensional nature of gaming skill more accurately than traditional single-metric approaches.