Quantitative Analysis of Game Balance in Fantasy Strategy Board Game

The game design uses specific quantitative parameters related to scoring, movement, risk, and resource acquisition to define gameplay length and introduce necessary elements of chance and forced resource cycling.

If a player focuses solely on 1-point tasks, they must successfully complete a minimum of ten tasks and pass the bank ten times. If they focus on 3-point tasks, they could win in as few as four tasks (e.g., three 3-point tasks and one 1-point task).

Probability and Chance Mechanics for Balance:

The game incorporates several probability mechanisms (dice rolls and coin flips) to ensure randomness in movement, combat, and resource acquisition, preventing any character from relying solely on their starting rank or position.

A. Duels and Combat (High Variance)

Duels occur when a player lands on a duel square, a checkpoint square in a large region, or if two players land on the same square (by mutual agreement).

1. Duel Resolution: The outcome is resolved by each player rolling two dice (2D6). The player who rolls the highest wins.

 ◦ Design Implication: Using 2 dice for combat resolution introduces the standard bell curve of probability (results 7, 6, 8 being most common), ensuring that combat outcomes are highly variable and unpredictable. This balances the game by allowing lower-ranking players a fair chance to defeat higher-ranking opponents and steal a token.

2. Reward/Loss: The winner gets to choose any token from the loser. This potential for high-value loss (losing a necessary token) reinforces the risk inherent in duels.

B. Small Region Token Acquisition (Fixed Probability)

The game provides a fixed probability mechanic for acquiring tokens from the three small regions (Apothecary, Church, and Castle).

1. Acquisition Chance: Once on or passing the bridge to these small regions, the player must perform a coin flip.

2. Success Rate: The token is acquired only if the flip is heads.

 ◦ Design Implication: This establishes a perfect 50% chance of success for these specific tokens, independent of dice rolls, character rank, or location on the board. This

mechanism standardizes the difficulty of acquiring these tokens, enhancing quantitative balance across these regions.

C. Movement and Streak Control (Rolling Doubles)

The use of two dice governs movement. The rule concerning rolling doubles introduces both advantage and mandatory risk management:

1. Advantage: If a player rolls doubles, they move, complete the action of the square they land on, and receive an extra turn (roll the dice again).

2. Risk Control: If a player rolls doubles three consecutive times, they must immediately move to the closest thief square.

  ◦ Design Implication: This serves as a quantitative control on luck-driven streaks. While extra turns (doubles) provide an immediate advantage, the cumulative probability of rolling doubles three times in a row forces an unavoidable penalty (losing 50% of tokens), thus preventing runaway winners based solely on successive lucky rolls.

Quantitative Design Factors in Character and Resource Balance:

A. Initial Hierarchy and Turn Order

The quantitative hierarchy established by the character ranks determines the starting turn order: Prince, Princess, Knight, Merchant, Farmer.

• Design Implication: Granting the higher-ranking characters (Prince/Princess) the initial advantage of moving first slightly biases the early game flow. However, this is balanced by the immediate and constant risk factors (Duels, Thief squares, and fixed probabilities in small regions) that affect all players equally, regardless of rank...

B. Resource Cycling and Punishment

The quantitative value of tokens lost when landing on a Thief square is crucial for game balance: 50% of tokens, rounded up.

• Example: A player with three tokens must dispose of two tokens (50% of 3 = 1.5, rounded up to 2).

• Design Implication: This steep penalty ensures that players cannot safely stockpile resources for long periods. The mechanism forces high-value token holders to constantly be wary of thief squares and encourages them to cash in tokens at the bank square quickly to gain points, promoting an active rather than hoarding play style.

Other Quantitative Metrics

data regarding average game time (start to win), average time per turn, or ranges of scores observed during playtesting give a time average of an hour to an hour and a half:

• Turn Structure: Each turn involves rolling two dice and movement. If no duels or complex actions occur, the average turn time would be very short (primarily rolling and moving).

• Token Cashing Frequency: To win, a player must land on or pass the bank squares to acquire points. The frequency of these necessary bank interactions governs the point-scoring pace of the game.

• Character Card Usage: All players have eight action cards. The game is designed to be completed (10 points) potentially using these eight cards, particularly if players prioritize 2- and 3-point tasks