# Response to the Performance Evaluation of the PiT EAD Model

In response to the feedback requesting a more comprehensive performance analysis of the PiT EAD model, we conducted a comparison between the model's predicted PiT EAD values and the actual observed values over the past few years. To assess the model’s accuracy and robustness, we utilized both Spearman and Pearson correlations.

## Rationale for Using Spearman and Pearson Correlations:

### 1. Spearman Correlation:

The Spearman correlation (ρs) is a non-parametric measure that evaluates the monotonic relationship between two variables. It is mathematically defined as:

ρs = 1 - [6Σdi²] / [n(n² - 1)]

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where di is the difference between the ranks of each pair of observations, and n is the number of observations. This correlation is particularly useful in capturing non-linear relationships between variables. In the context of our PiT EAD model, Spearman’s correlation effectively captures the consistency in the ranking of predicted and observed values, regardless of their linear relationship. The obtained Spearman coefficient of 98% indicates a high level of concordance in the relative ordering of the model’s predictions and the observed values.

### 2. Pearson Correlation:

The Pearson correlation (r) measures the linear relationship between two variables and is defined as:

r = [Σ(xi - x̄)(yi - ȳ)] / [√Σ(xi - x̄)² √Σ(yi - ȳ)²]

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where xi and yi are the individual values of the variables, and x̄ and ȳ are their respective means. This method is widely used in financial models to assess the strength and direction of linear relationships. Given that the PiT EAD model is designed to predict values where a linear relationship is expected, using Pearson’s correlation is appropriate to confirm the model’s accuracy in this context. The obtained Pearson coefficient of 99% reflects a very strong linear relationship between the predicted and observed values, reinforcing the model’s reliability and robustness.

## Conclusion:

The results from both correlations indicate significant robustness in the PiT EAD model’s performance. By combining Spearman and Pearson tests, we can evaluate both the linear and monotonic relationships between the model’s predictions and the actual observations, providing a comprehensive view of the model’s performance. These results underscore the accuracy and reliability of the model in fulfilling its purpose in calculating PiT EAD.