

Response to Referee # 2

Dear Referee,

Thank you sincerely for taking the time to review our paper. We greatly appreciate your thoughtful feedback, which will help us significantly improve our work. In this letter, we have carefully addressed each of your comments and provided our responses to your suggestions. All revisions made in response to referee feedback are highlighted in green in the updated submission.

Major Comments:

1. Comment: Comparison with Existing Models: While the paper presents a new model for generating returns from private equity cash flows, it lacks a direct comparison with existing methods. The mention of calculating the Internal Rate of Return (IRR) directly in Section 4.2 suggests an opportunity for comparison. Even if the proposed model does not always outperform existing methods, its unique advantages can still be highlighted. This comparison would strengthen the paper's contribution by demonstrating its relative performance.
 - a. Response: Agree, we newly added Appendix A “Comparison to competing approaches” on pages 22 and 23 where we discuss the intricacies associated with existing methods for (1) return measurement, (2) factor-model estimation, and (3) error-term derivation. Here we also establish that the fundamental problem is stale pricing of NAVs which makes the measurement of “true” PE returns infeasible.
2. Comment: Multi-dimensional Validation: The paper currently validates the model's effectiveness primarily through visual comparisons of cumulative returns and autocorrelation functions (ACFs) between the model-generated returns and NAV returns from different data sources. While these visual comparisons are intuitive, they lack statistical rigor. I recommend incorporating additional statistical metrics like R-squared, Mean Squared Error (MSE), or other relevant measures to quantitatively assess the model's accuracy and performance. This would provide a more comprehensive evaluation of the model's effectiveness across different private equity fund types and time periods.
 - a. Response: Agree, that we can add quantitative measures of model performance. However, as “true” PE returns are unobservable, we need to measure the distance between NAV returns (which are only proxy returns) and our model returns. We added Table 3 with quantitative measures like MSE, MAE, ... on page 17, which is referenced on page 13.

Minor Comments:

1. Comment: Section 3 discusses the reasons for using ensemble methods for private equity funds, setting the stage for the use of combination and boosting techniques. Some reasons are repetitive and could be consolidated or reduced in length. For example, 3.1 mentions data privacy as a reason for limited data, while 3.2 discusses

the late start of data collection and limited sample sizes, both of which contribute to data scarcity. Additionally, 3.3 also mentions limited data.

- a. Response: Generally, we agree that we could further streamline Section 3. However, given that Section 3 is only a little longer than one page, we prefer to keep our original structure where we briefly highlight the data scarcity issue from several dimensions. We kept the original version unchanged and hope this is acceptable to you.
2. Comment: Section 4.1 proposes methods for selecting valid models (M^*), but the empirical section does not specify the value of x used (likely $x = 1$).
 - a. Response: Agree, we confirm now that we do not exclude any model on page 9-10.
3. We newly introduced Section “5.3 Model limitations for other fund types” on page 17 as response to your final three points that are all tackled in this section. Thus, we agree to all three observations and chose to answer them in a combined manner.
 - a. Comment: In the conclusion part, the results for Buyout funds could be more thoroughly discussed in the empirical section. We could focus more on the model's strengths and weaknesses in this part. The conclusion also mentions potential unreliability of the model at the beginning and end of the error term time series. It would be better to suggest possible solutions for this issue.
 - b. Additional Suggestion: Exploration of Model Limitations: Discuss potential limitations of the proposed model, such as its assumptions or potential biases. This would enhance the paper's transparency and credibility.
 - c. Additional Suggestion: Investigation of Model Robustness: Compare model from 3 data sources with 3 NAV returns by metrics to validate the model's robustness. This would further strengthen the paper's conclusions and enhance its generalizability.
 - d. Response to (a), (b) and (c): Agree, we newly introduced Section 5.3 on page 16-17 which refers to the new Appendix B that contains return charts for multiple fund types on pages 24-38. So, we discuss the model limitations with reference to other fund types where the model's shortcomings (outliers) are more obvious. We hope Appendix B is not too long for the Journal.

In total, we have added 17-18 new pages to incorporate your suggestions, with 16 of those pages included in the Appendix and 14 pages being only charts. Thank you very much, for your valuable feedback!