

## Appendix: Data leakage Shallow-LLP:

The Figures below show the AUC and Brier Score performance of the Shallow-LLP trained using the random approach and time-aware approach for time frame sizes from 5 up to 24 months. Note that **R** indicates time frames where the random approach most is the best performing, **T** indicates time frames where the time-aware approach model is the best performing and **N** indicates time frames where there is no significant difference between the performance of the two models.

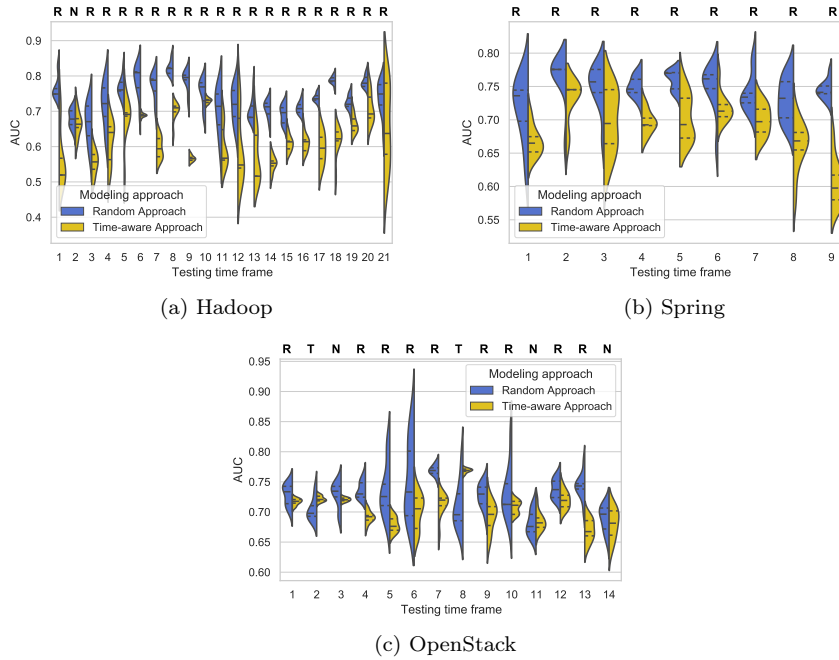


Fig. 1: AUC performance of the random and time-aware models on five months testing time frames.

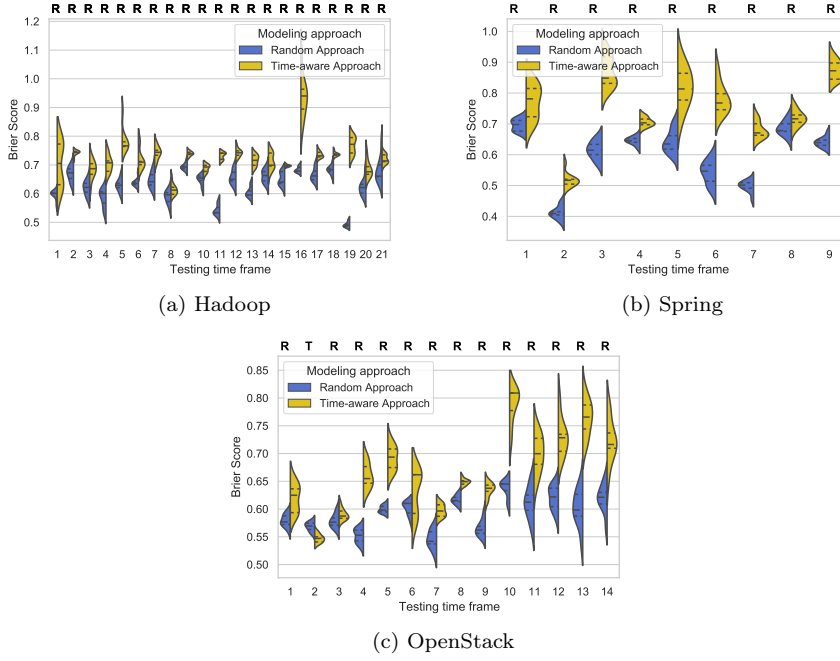


Fig. 2: Brier Score performance of the random and time-aware models on five months testing time frames.

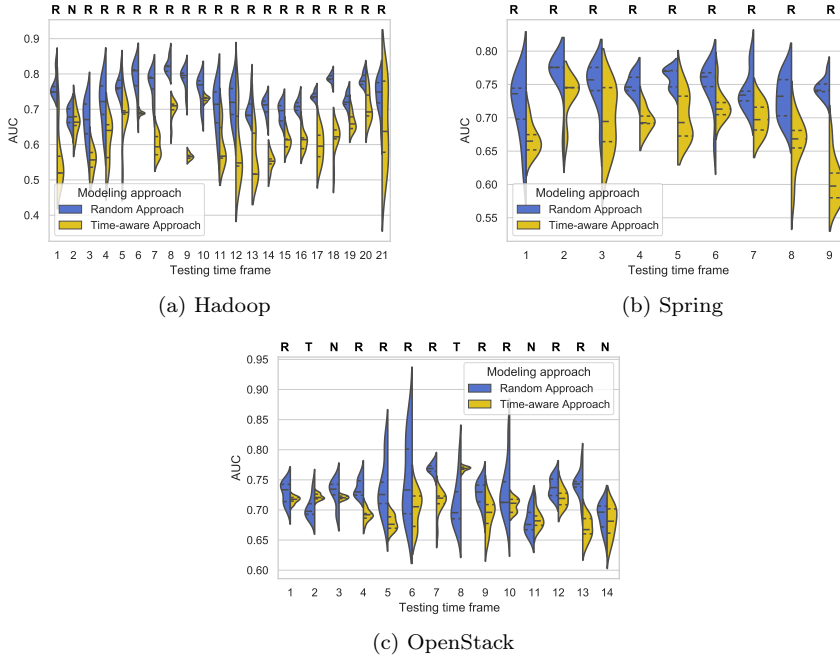


Fig. 3: AUC performance of the random and time-aware models on six months testing time frames.

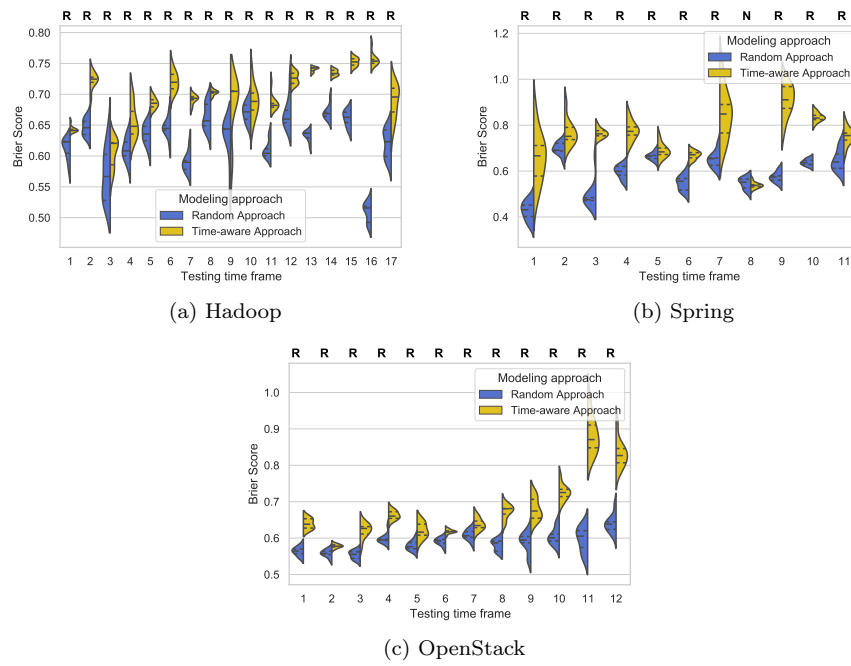


Fig. 4: Brier Score performance of the random and time-aware models on six months testing time frames.

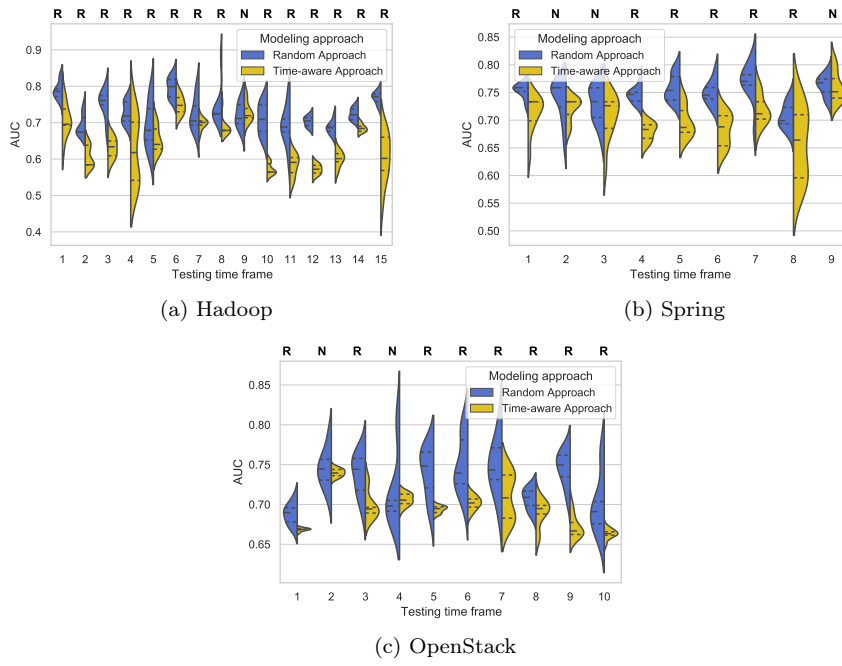


Fig. 5: AUC performance of the random and time-aware models on seven months testing time frames.

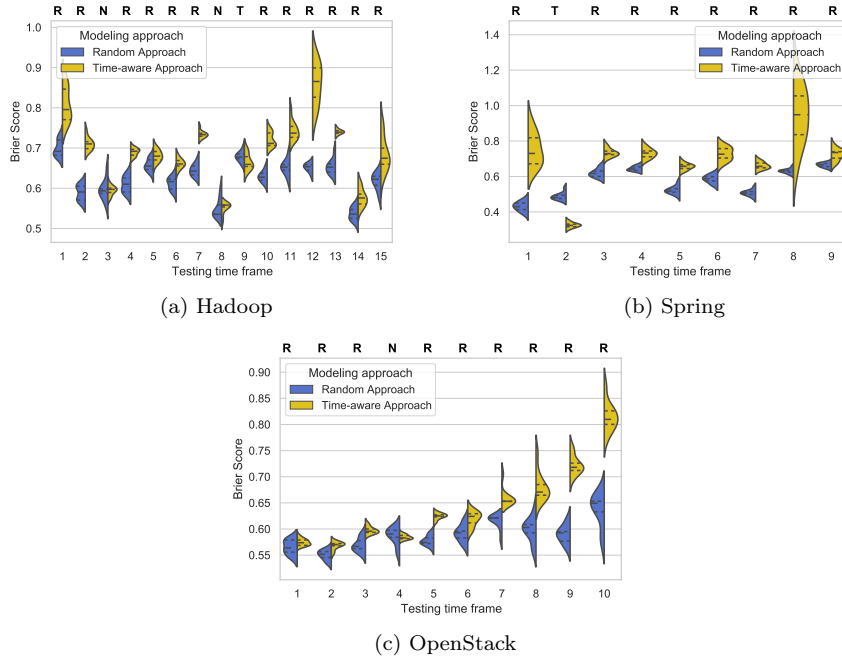


Fig. 6: Brier Score performance of the random and time-aware models on seven months testing time frames.

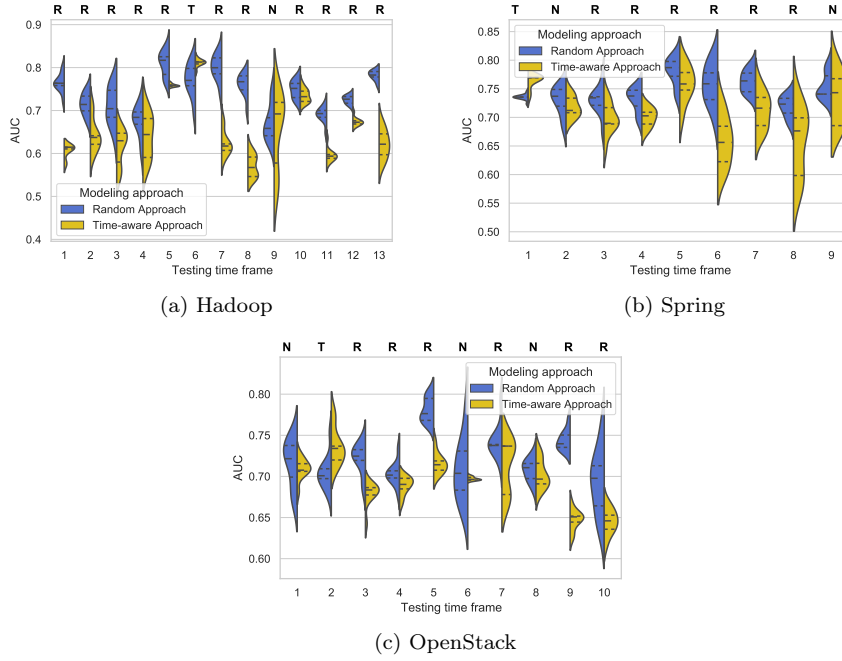


Fig. 7: AUC performance of the random and time-aware models on eight months testing time frames.

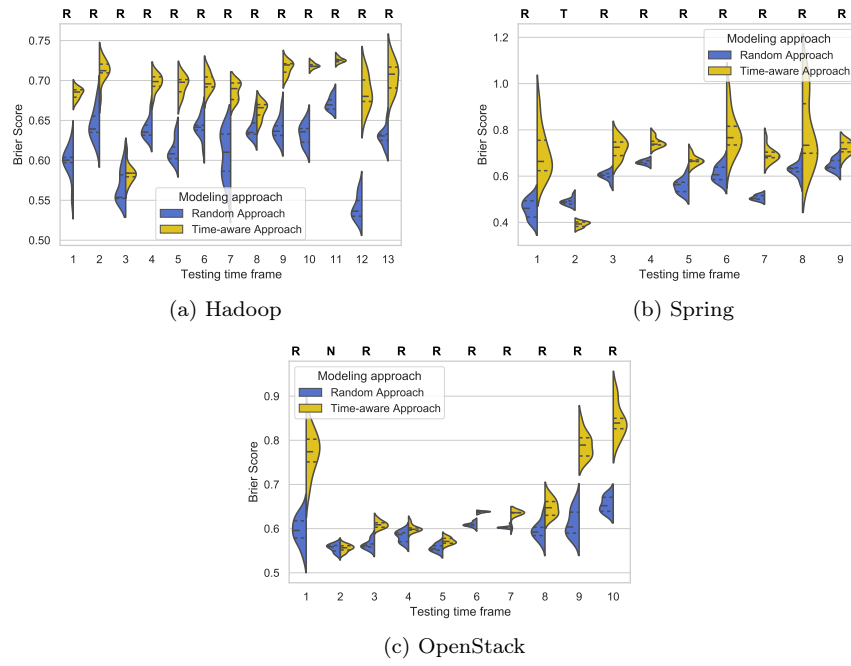


Fig. 8: Brier Score performance of the random and time-aware models on eight months testing time frames.

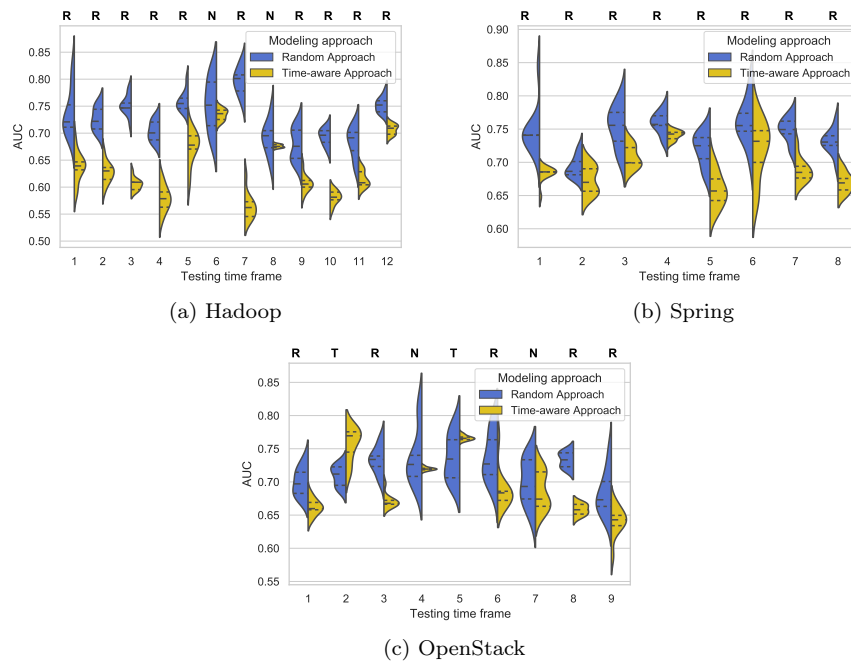


Fig. 9: AUC performance of the random and time-aware models on nine months testing time frames.

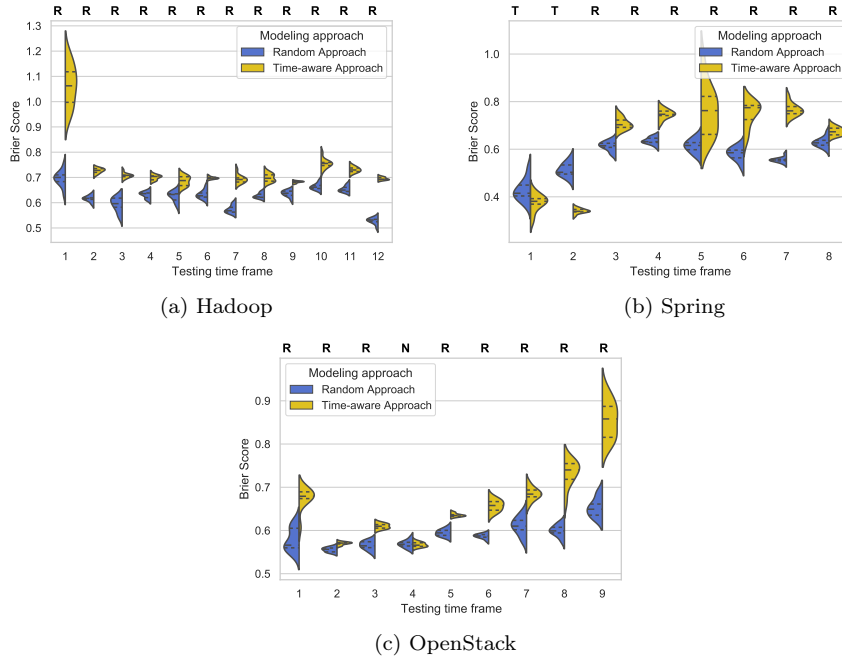


Fig. 10: Brier Score performance of the random and time-aware models on nine months testing time frames.

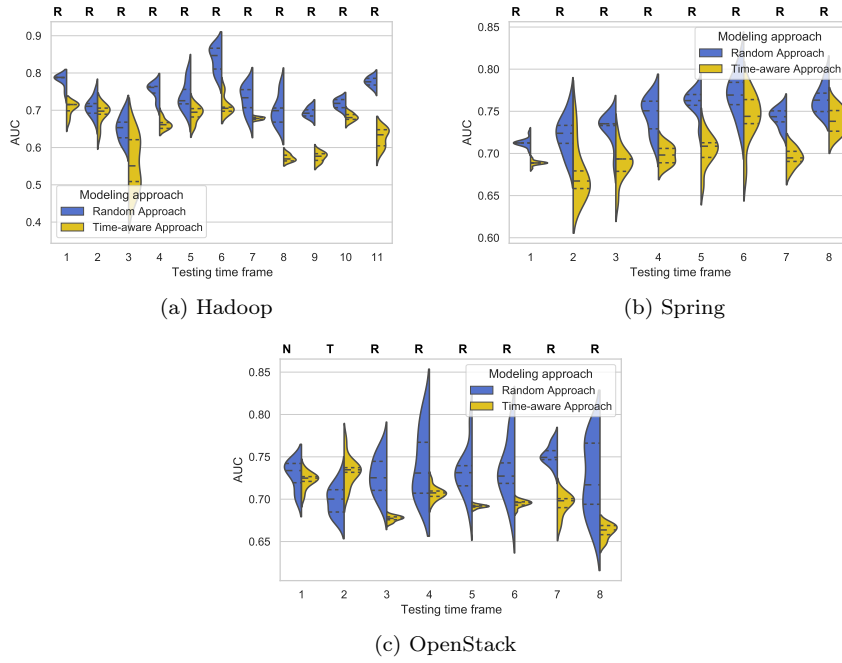


Fig. 11: AUC performance of the random and time-aware models on 10 months testing time frames.



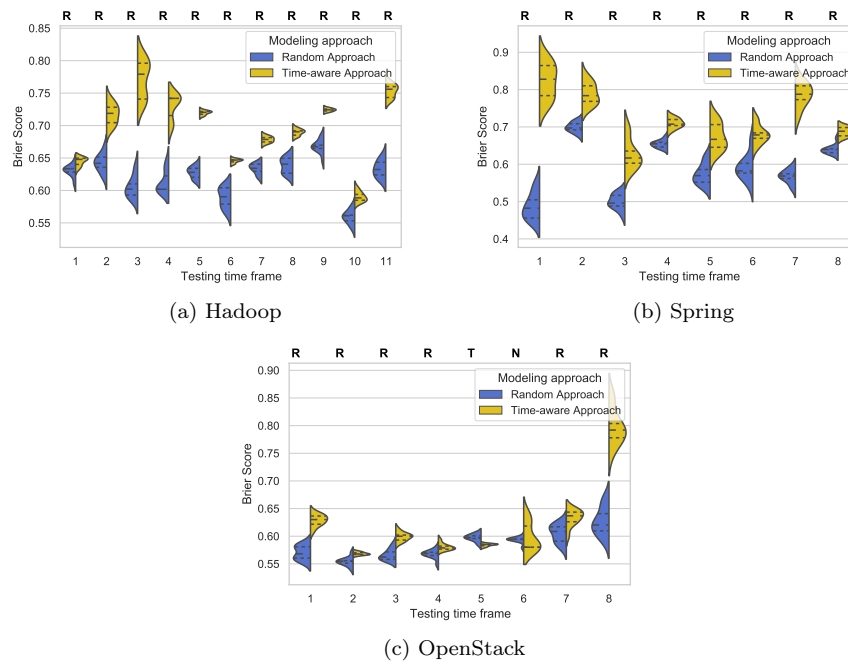


Fig. 12: Brier Score performance of the random and time-aware models on 10 months testing time frames.

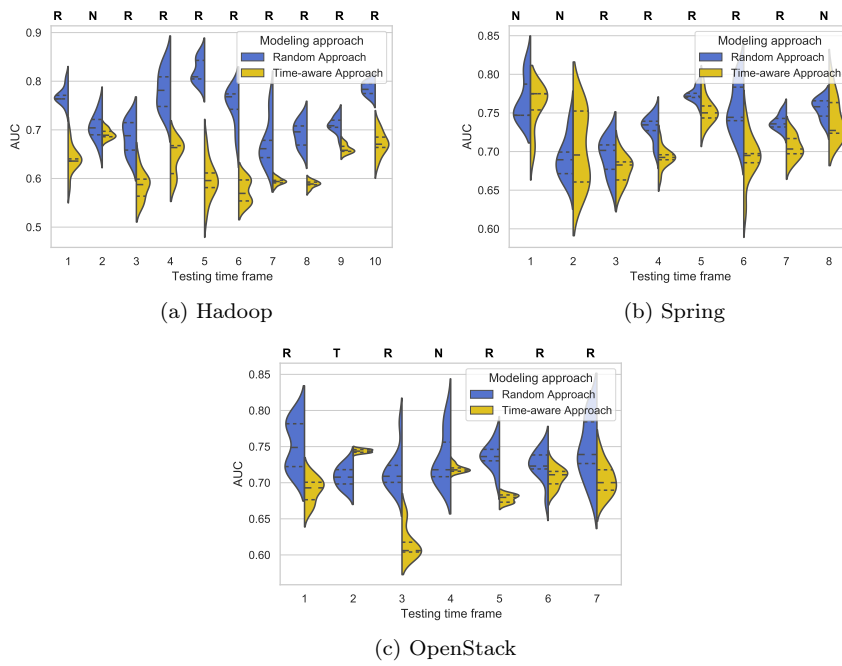


Fig. 13: AUC performance of the random and time-aware models on 11 months testing time frames.

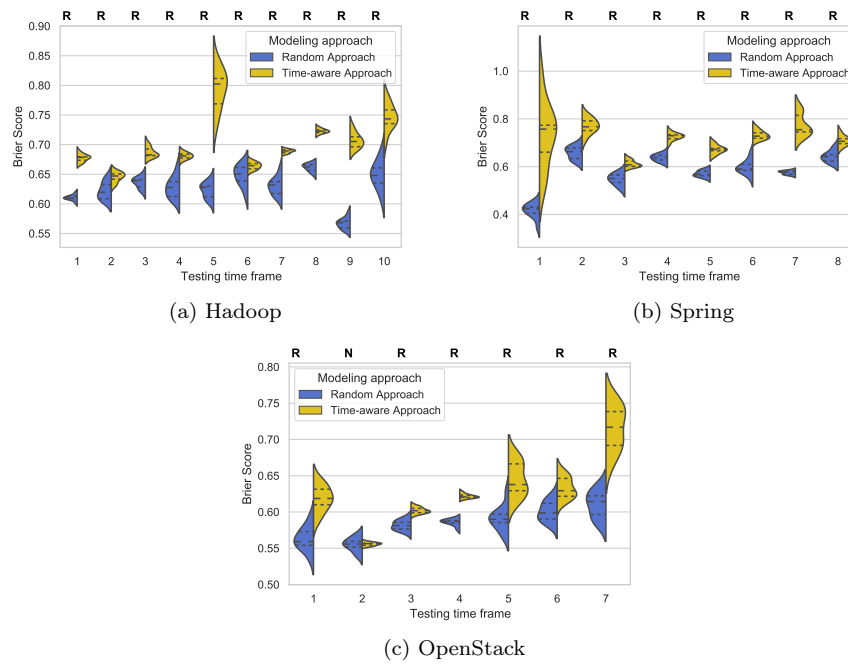


Fig. 14: Brier Score performance of the random and time-aware models on 11 months testing time frames.

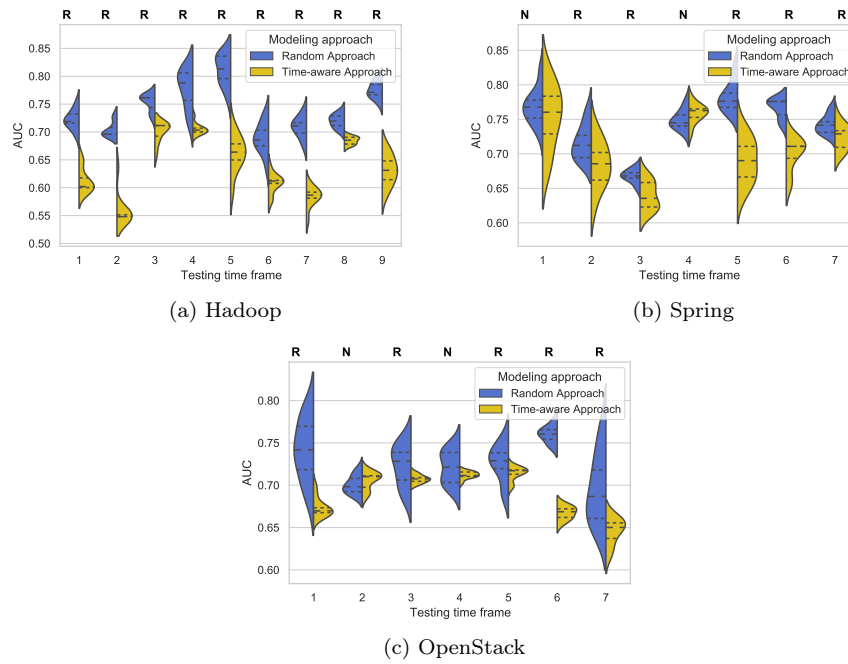


Fig. 15: AUC performance of the random and time-aware models on 12 months testing time frames.

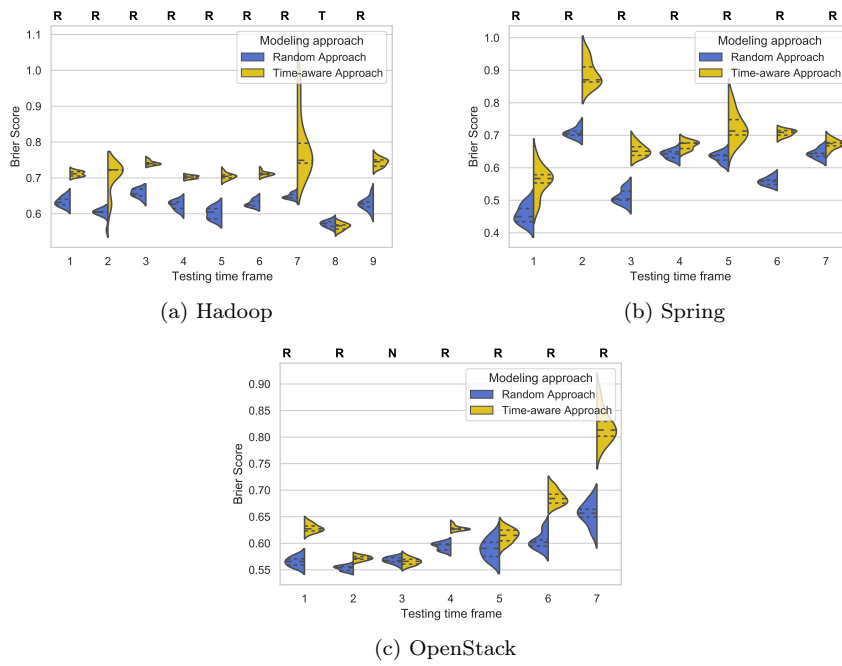


Fig. 16: Brier Score performance of the random and time-aware models on 12 months testing time frames.

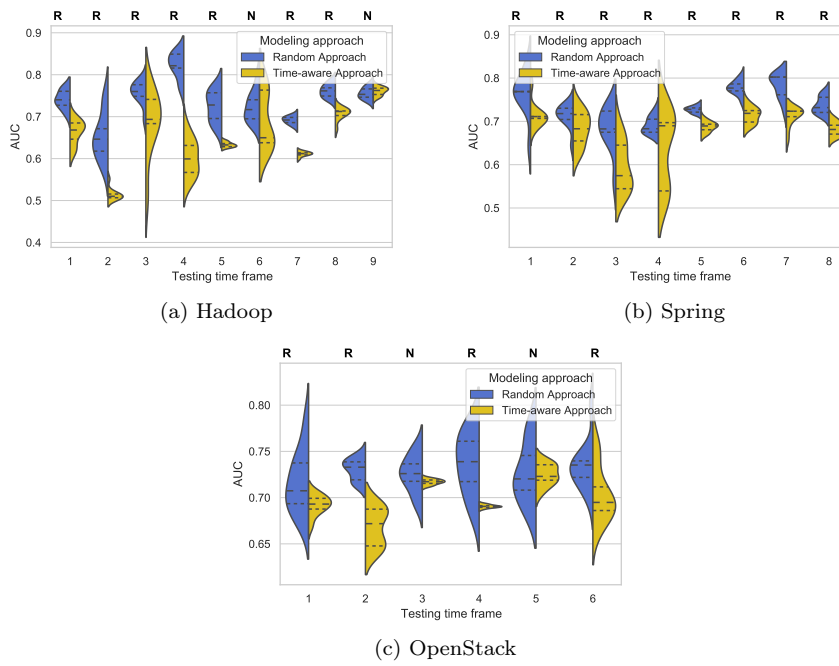


Fig. 17: AUC performance of the random and time-aware models on 13 months testing time frames.

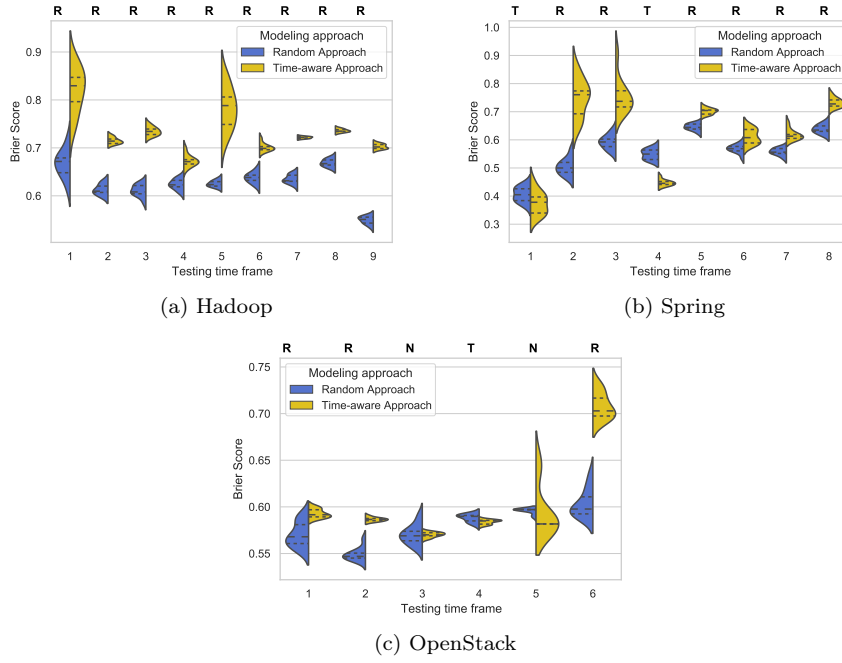


Fig. 18: Brier Score performance of the random and time-aware models on 13 months testing time frames.

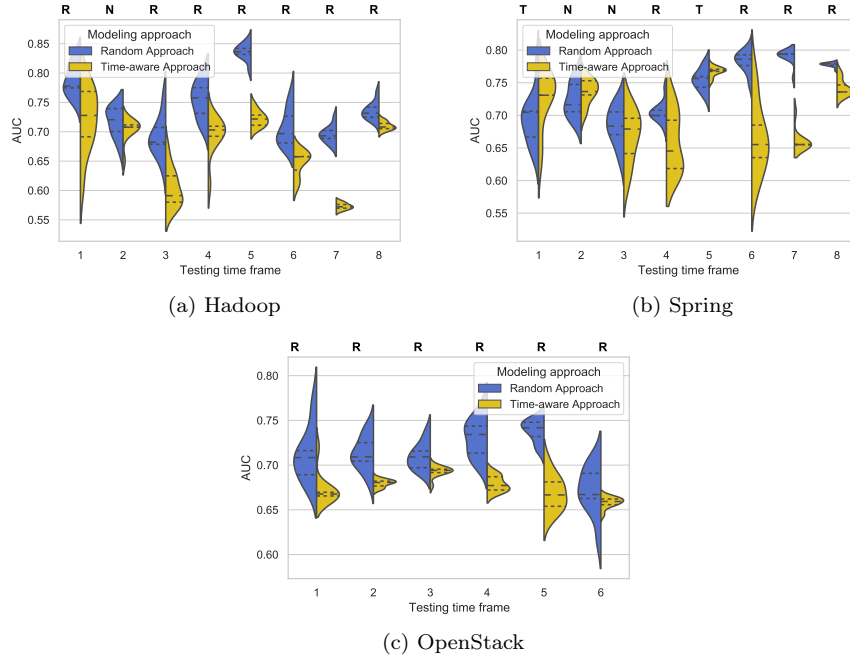


Fig. 19: AUC performance of the random and time-aware models on 14 months testing time frames.

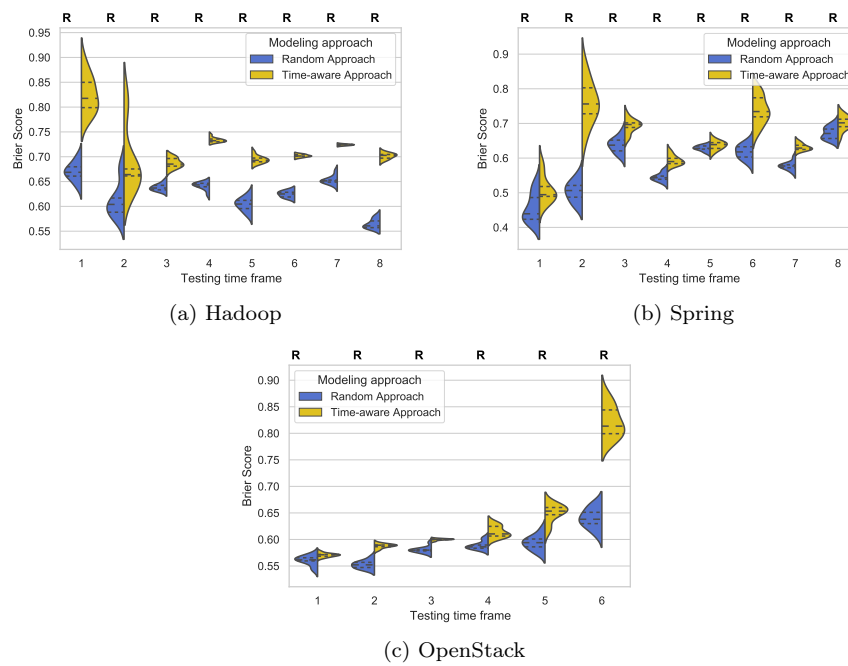


Fig. 20: Brier Score performance of the random and time-aware models on 14 months testing time frames.

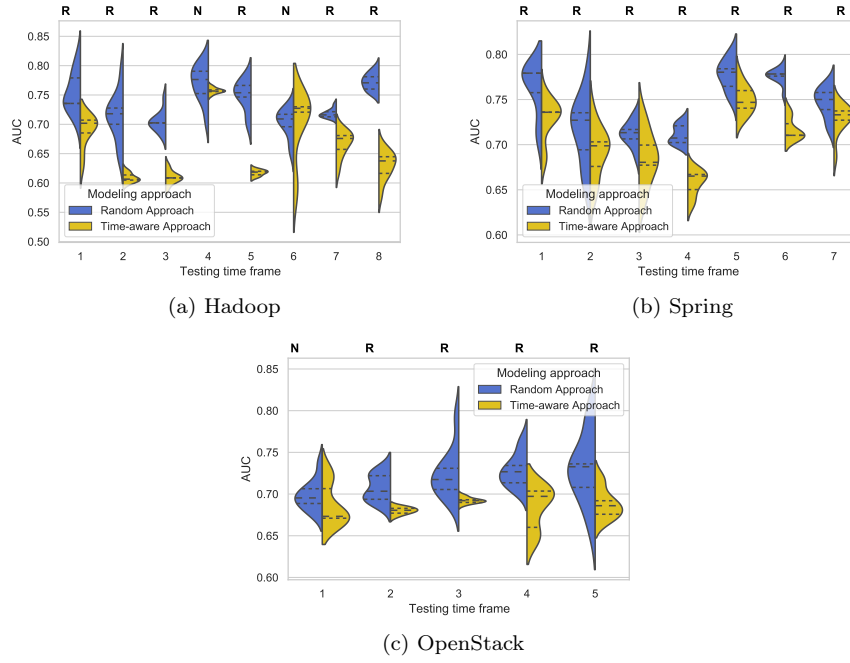


Fig. 21: AUC performance of the random and time-aware models on 15 months testing time frames.



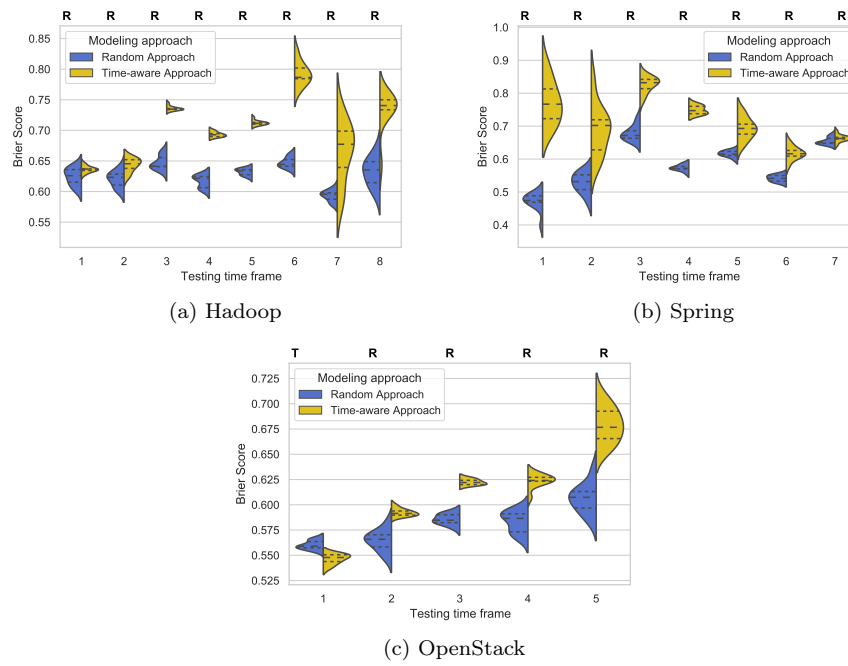


Fig. 22: Brier Score performance of the random and time-aware models on 15 months testing time frames.

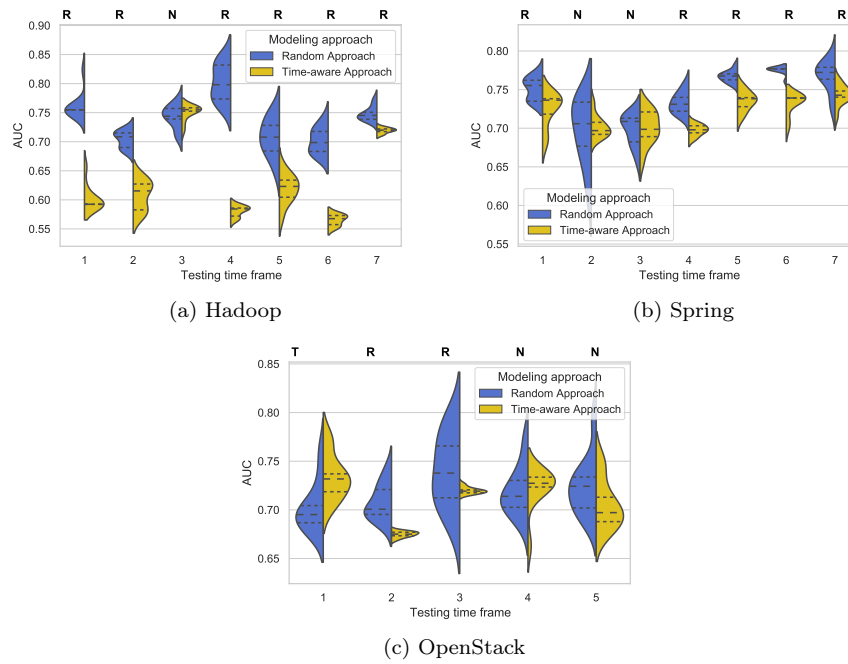


Fig. 23: AUC performance of the random and time-aware models on 16 months testing time frames.

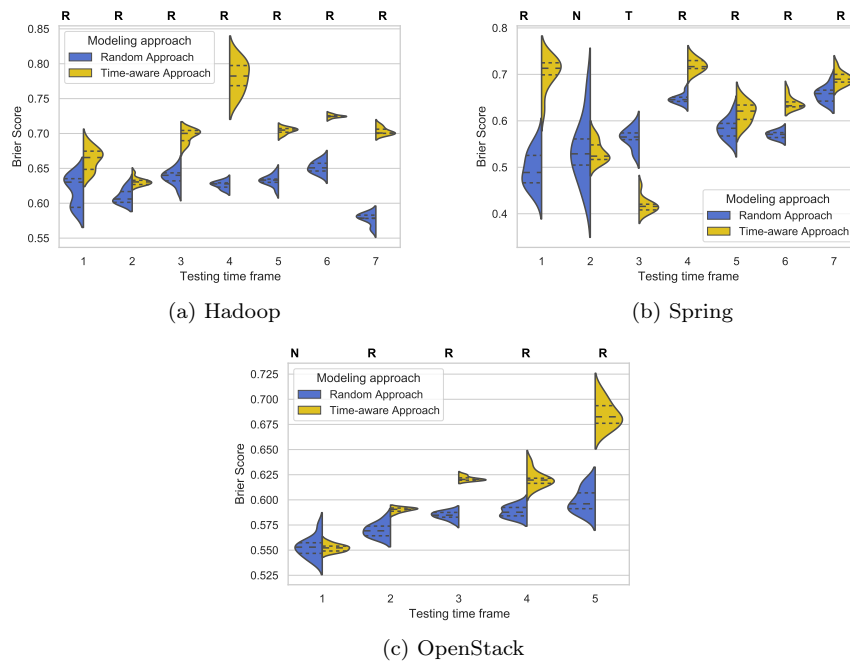


Fig. 24: Brier Score performance of the random and time-aware models on 16 months testing time frames.

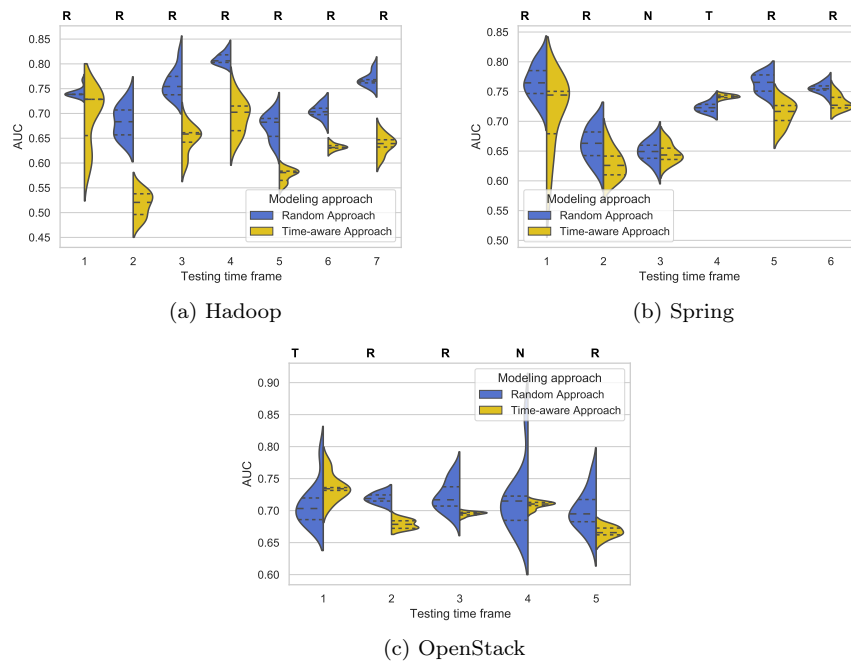


Fig. 25: AUC performance of the random and time-aware models on 17 months testing time frames.

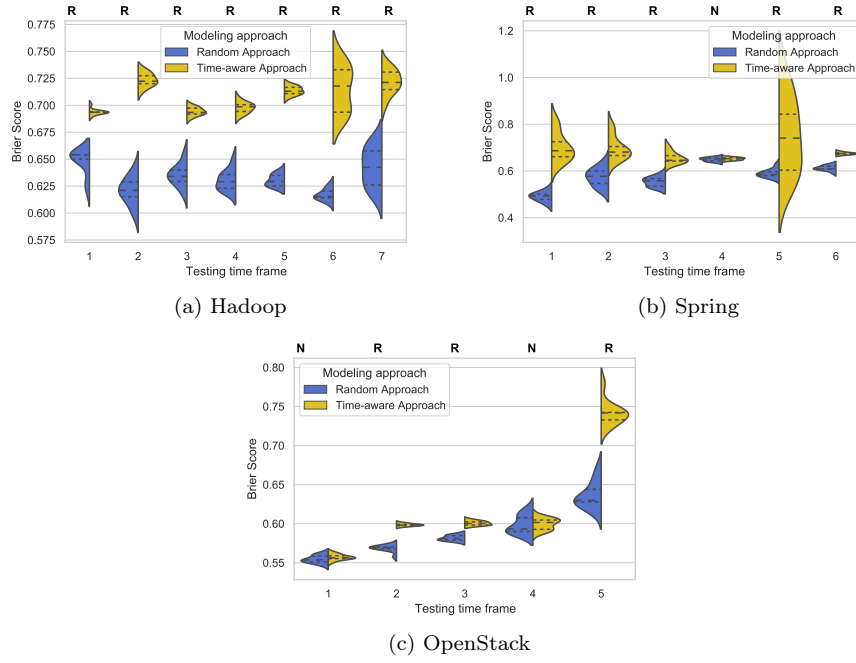


Fig. 26: Brier Score performance of the random and time-aware models on 17 months testing time frames.

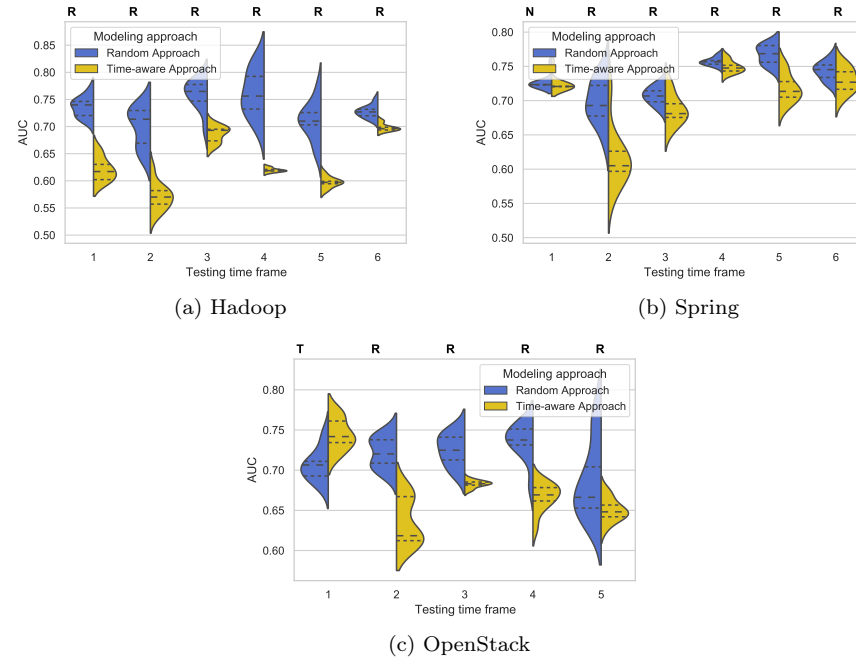


Fig. 27: AUC performance of the random and time-aware models on 18 months testing time frames.

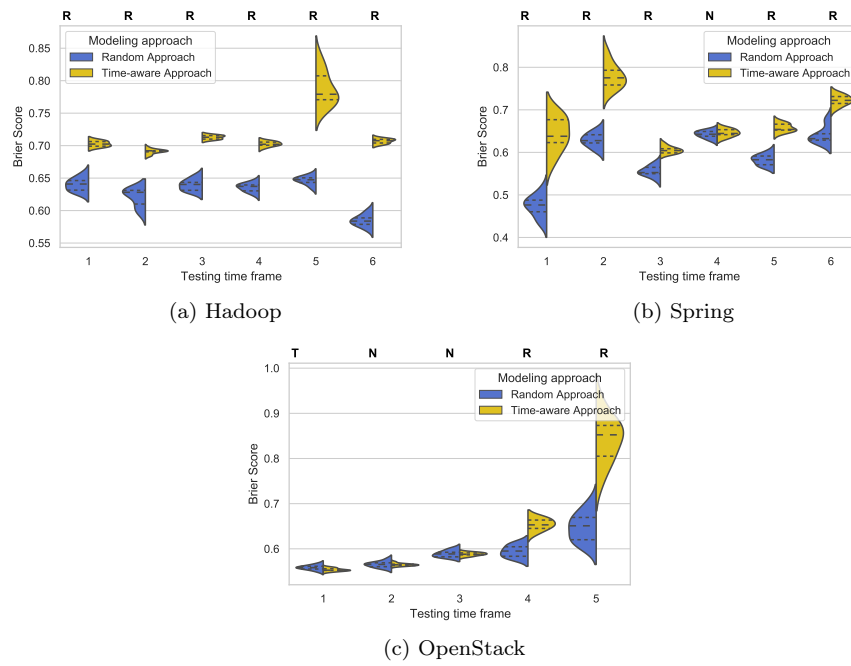


Fig. 28: Brier Score performance of the random and time-aware models on 18 months testing time frames.

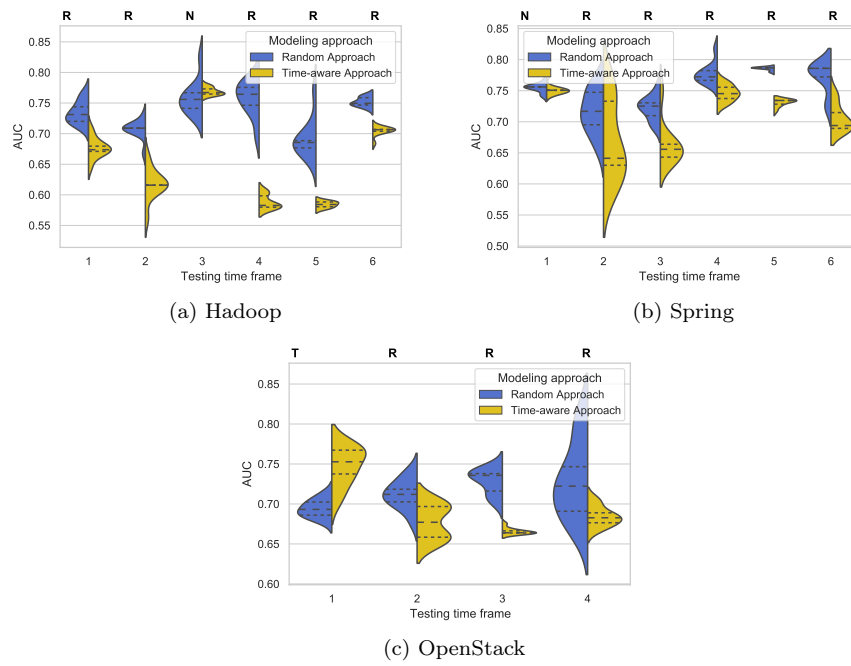


Fig. 29: AUC performance of the random and time-aware models on 19 months testing time frames.

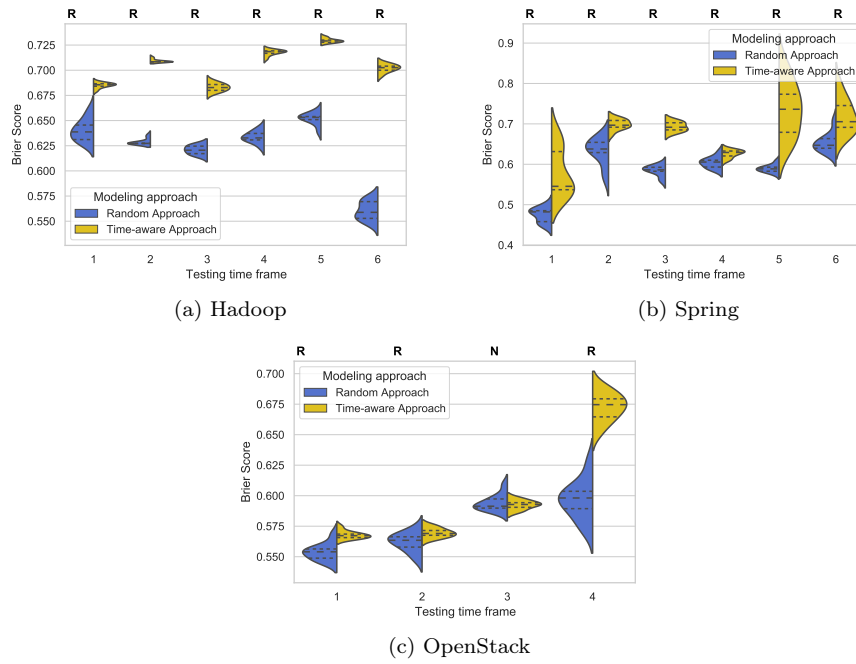


Fig. 30: Brier Score performance of the random and time-aware models on 19 months testing time frames.

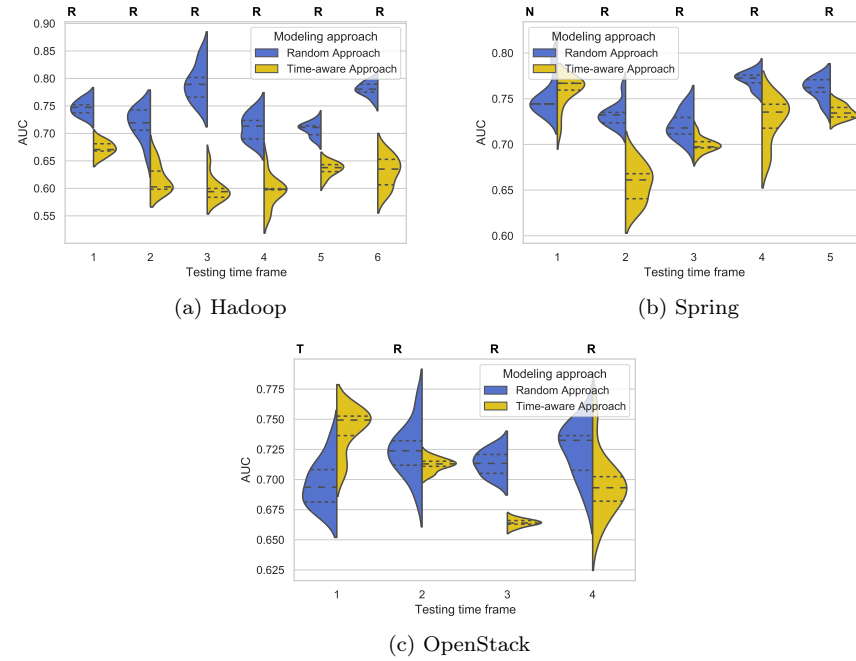


Fig. 31: AUC performance of the random and time-aware models on 20 months testing time frames.

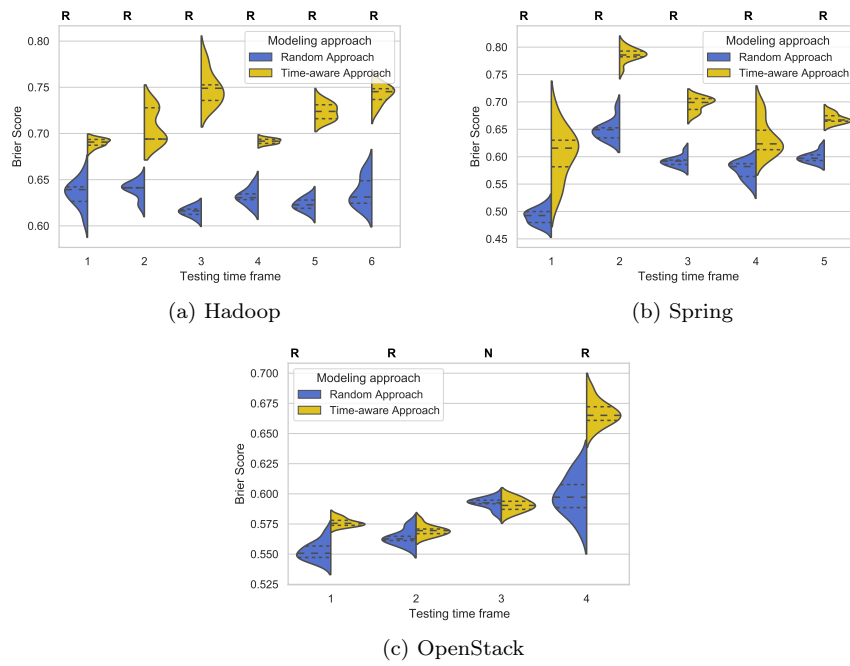


Fig. 32: Brier Score performance of the random and time-aware models on 20 months testing time frames.



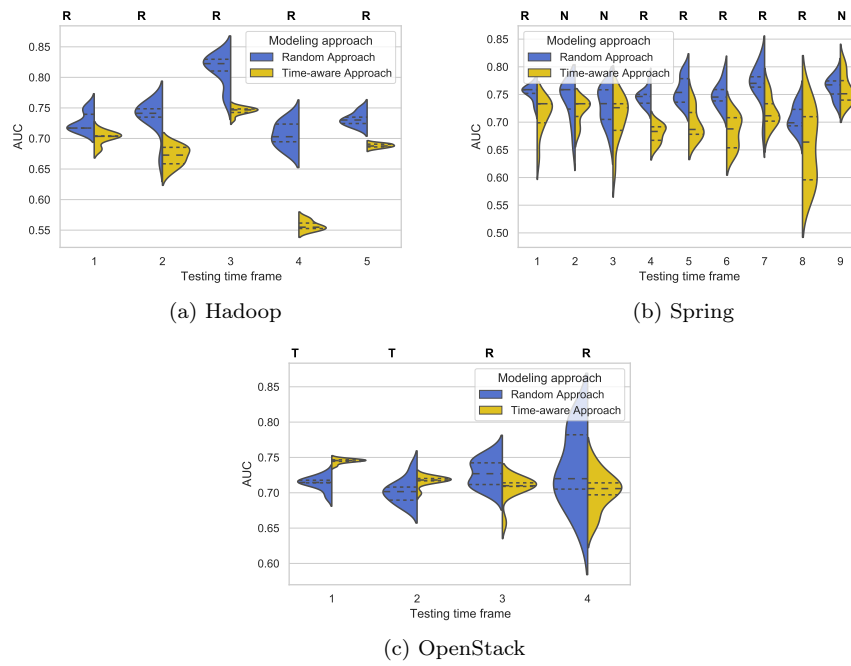


Fig. 33: AUC performance of the random and time-aware models on 21 months testing time frames.

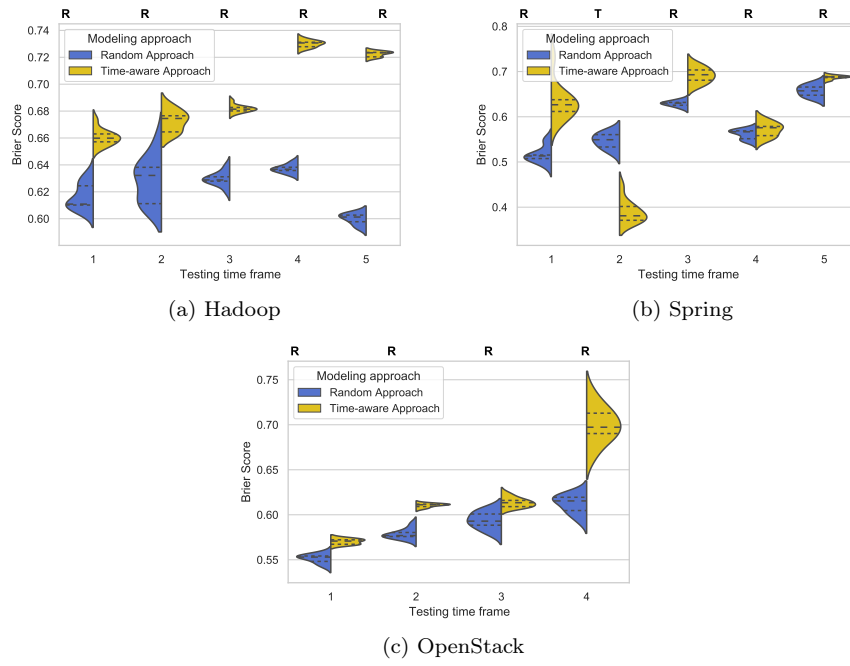


Fig. 34: Brier Score performance of the random and time-aware models on 21 months testing time frames.

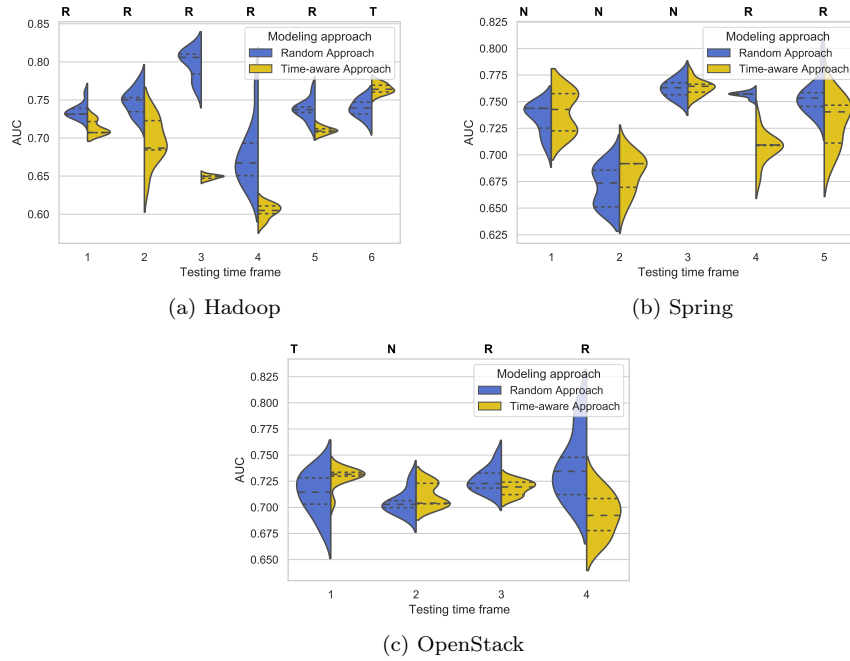


Fig. 35: AUC performance of the random and time-aware models on 22 months testing time frames.

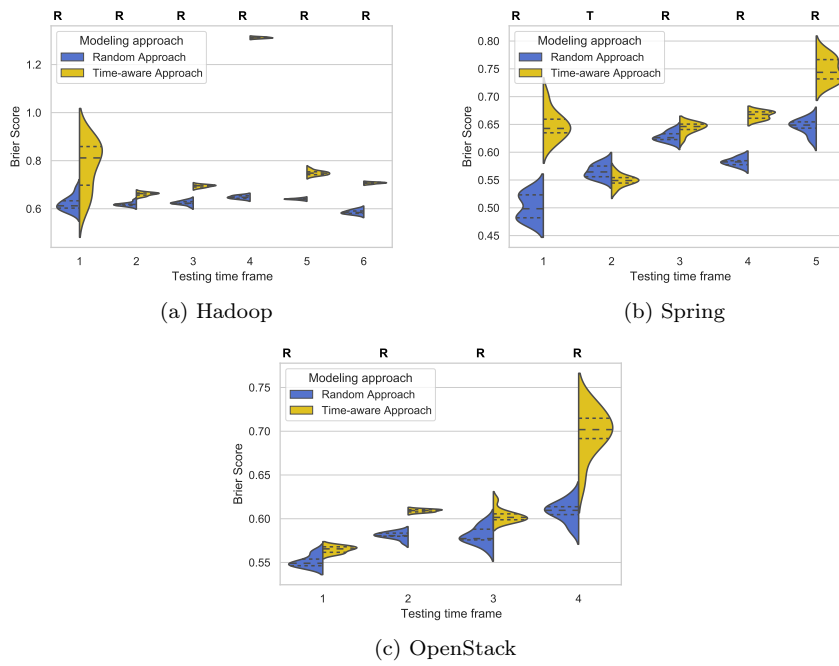


Fig. 36: Brier Score performance of the random and time-aware models on 22 months testing time frames.

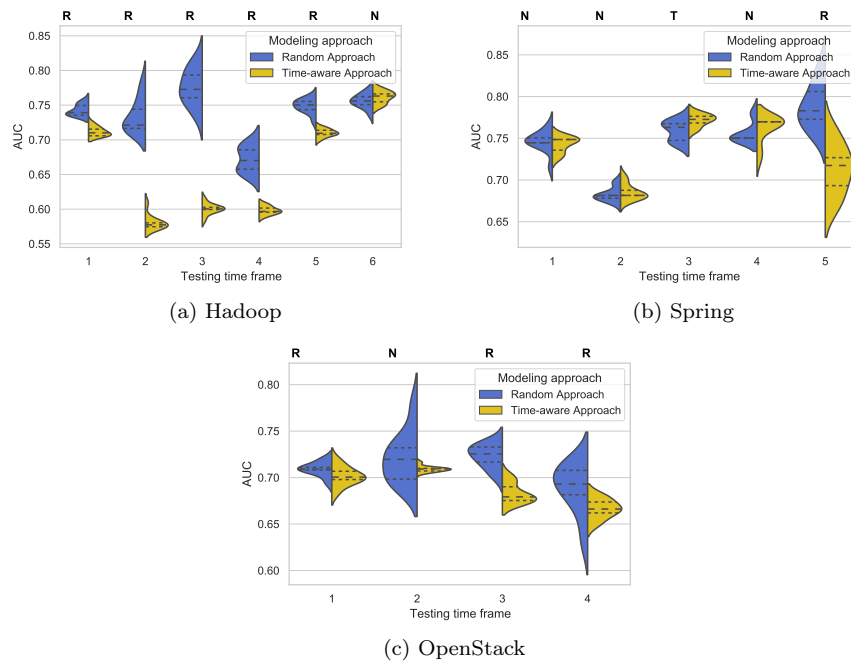


Fig. 37: AUC performance of the random and time-aware models on 23 months testing time frames.

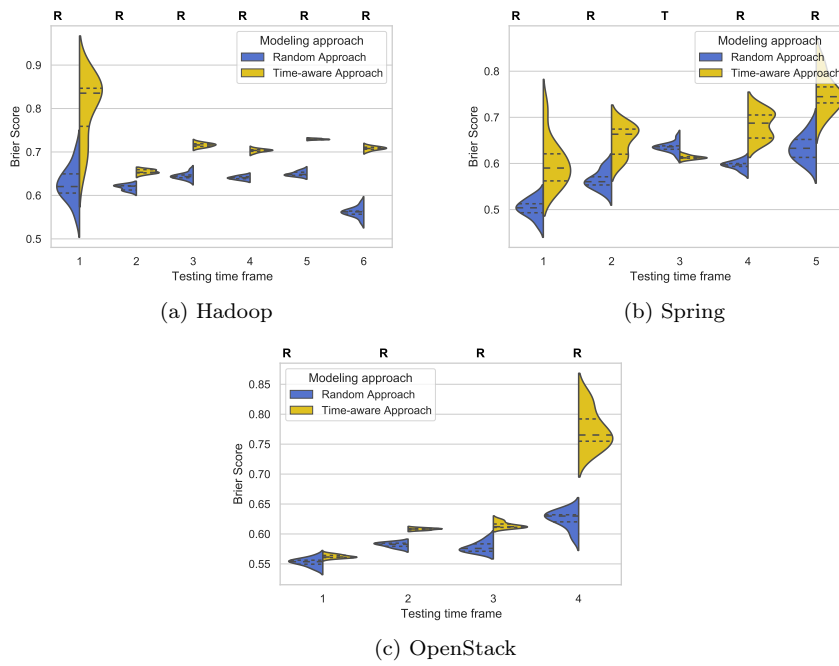


Fig. 38: Brier Score performance of the random and time-aware models on 23 months testing time frames.

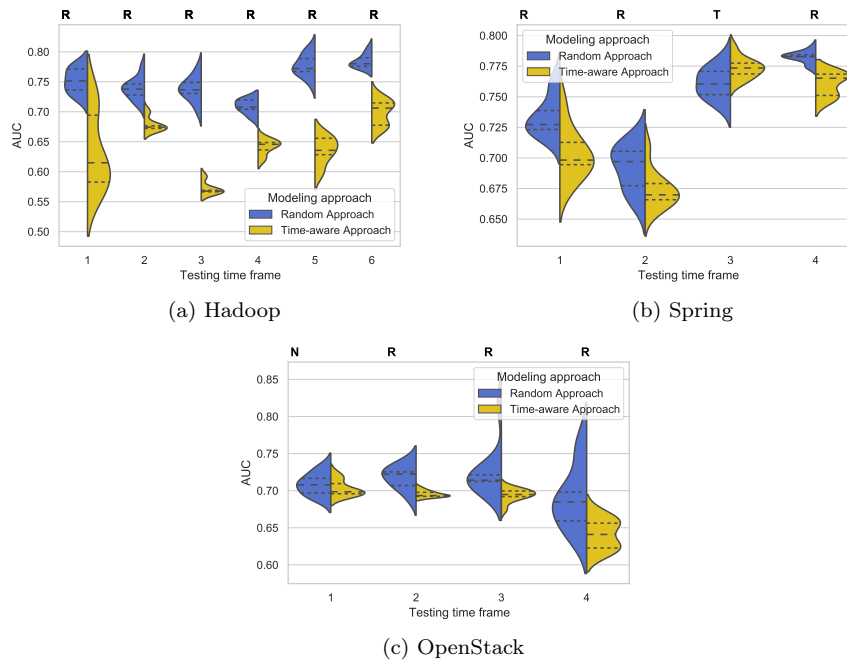


Fig. 39: AUC performance of the random and time-aware models on 24 months testing time frames.

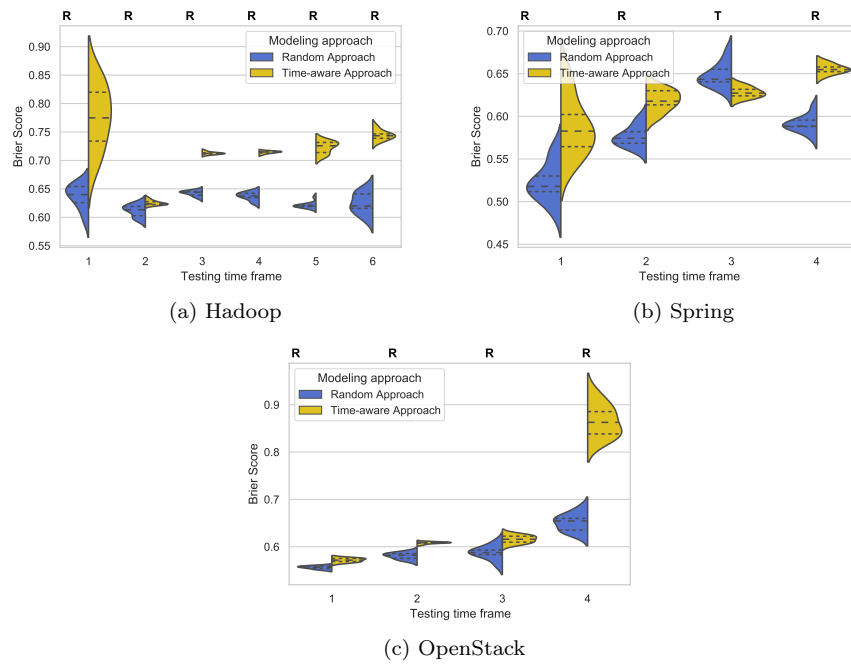


Fig. 40: Brier Score performance of the random and time-aware models on 24 months testing time frames.