

Model Validation for Amhara Malaria Forecasting

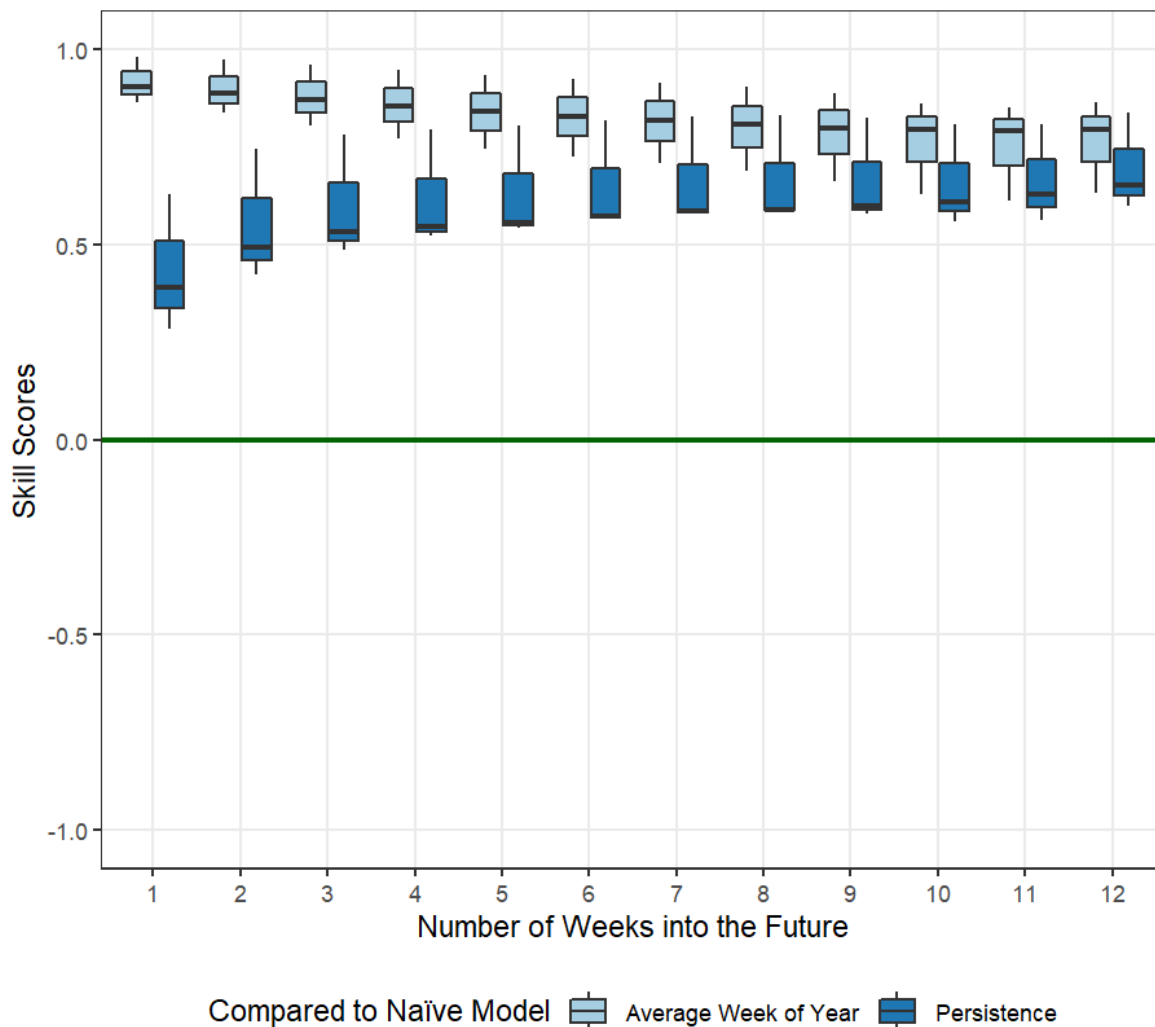
Plasmodium falciparum and mixed species

07 January 2018 - 06 January 2019

EPIDEMIA Team

December 5, 2019

1 Skill Scores Summaries



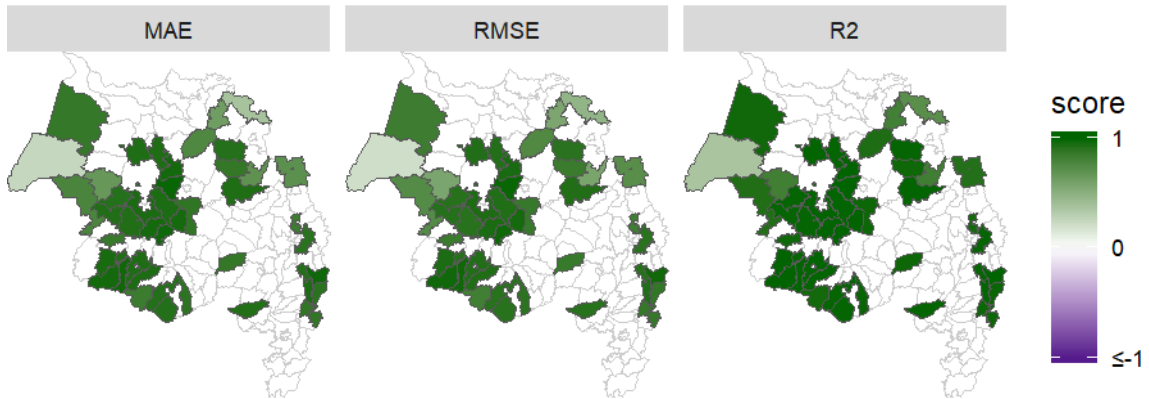
Skill scores show the improvement (with values greater than 0) of the forecast model over simple naive models. There are three accuracy statistics used: Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and an R2 (variance explained). These statistics are compared against the naive models to give the skill scores. The boxplot shows the concordance of skill among the three statistics. Higher values (0 to 1) indicate the greater skill of the forecast models over the simple naive models.

The x-axis is the number of weeks being forecasted into the future. The validation was run with the assumption that there is a reporting lag of 0 weeks.

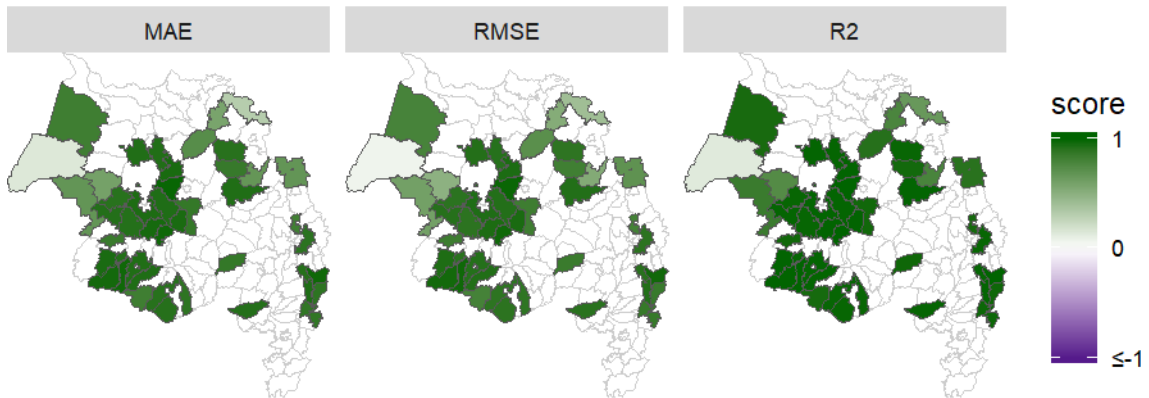
2 Maps of Skill Statistics

2.1 Average Week of Year

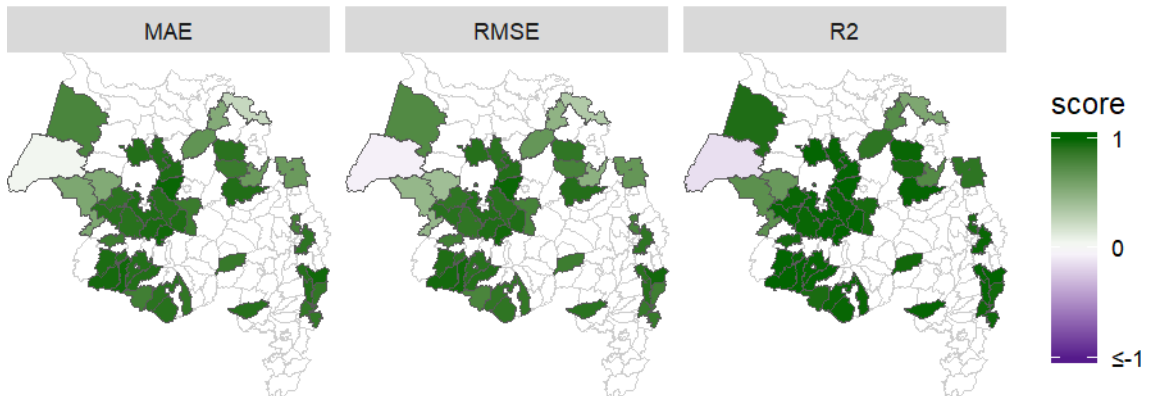
1 Weeks into the Future



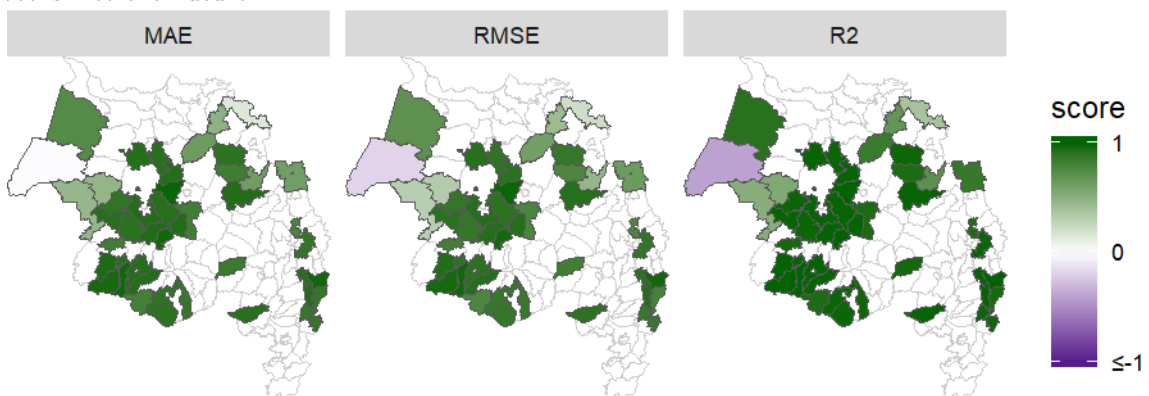
2 Weeks into the Future



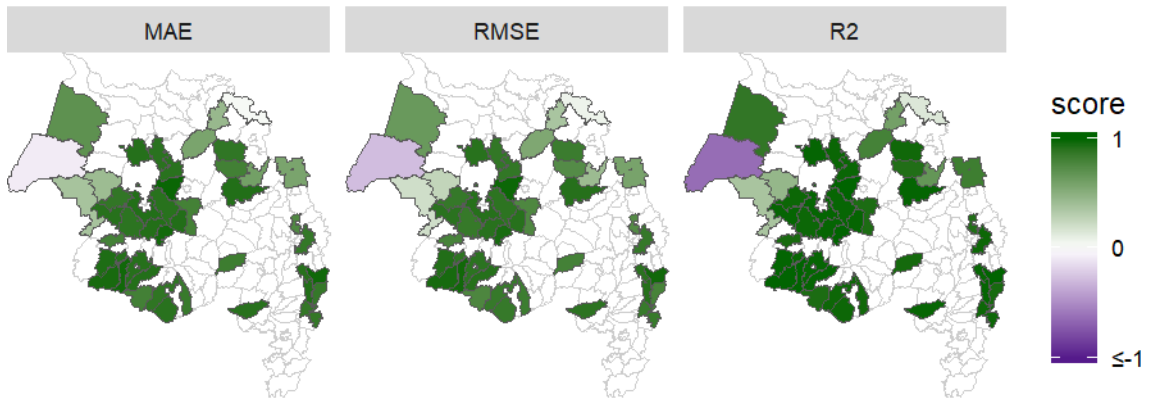
3 Weeks into the Future



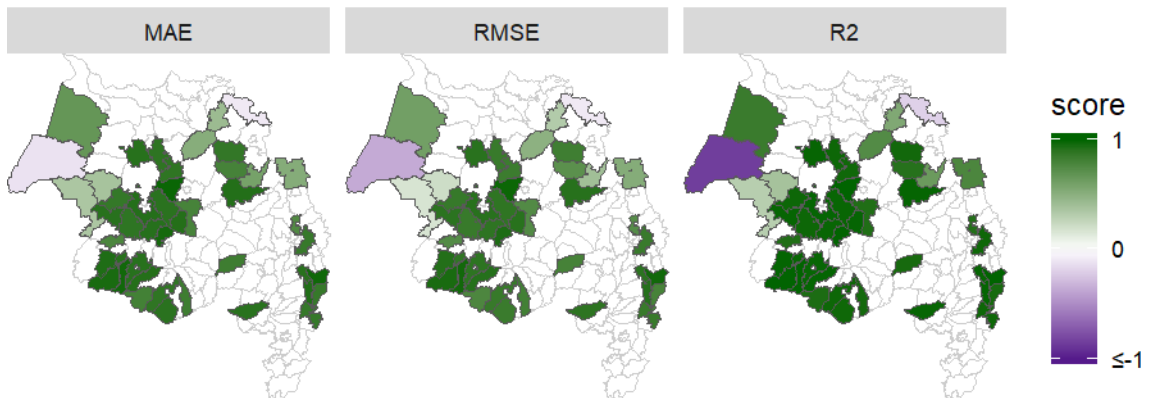
4 Weeks into the Future



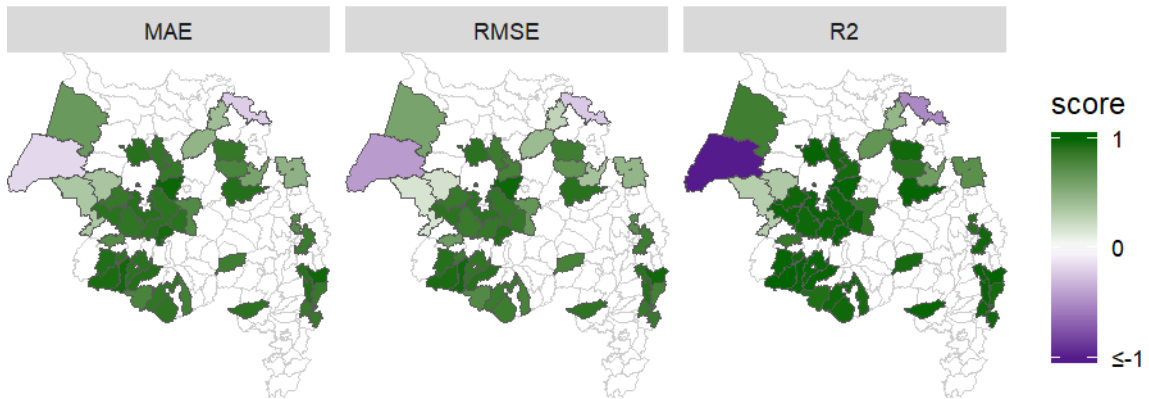
5 Weeks into the Future



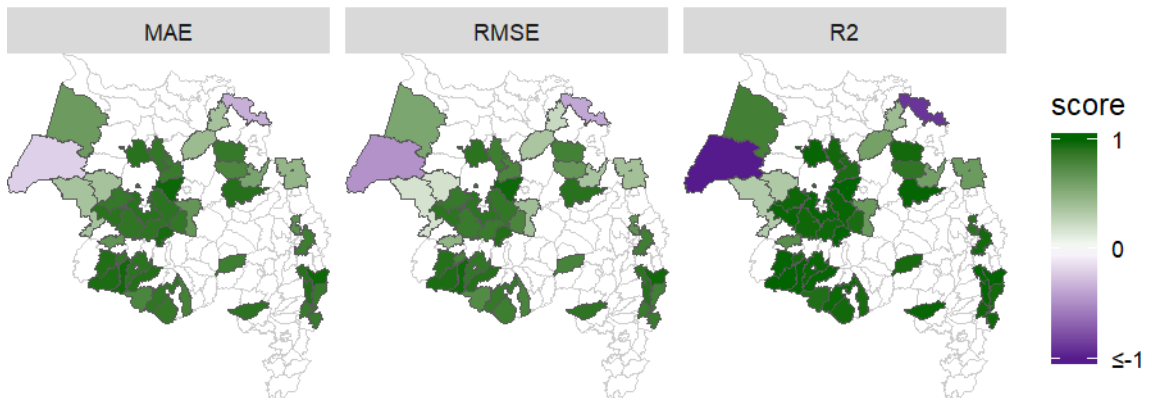
6 Weeks into the Future



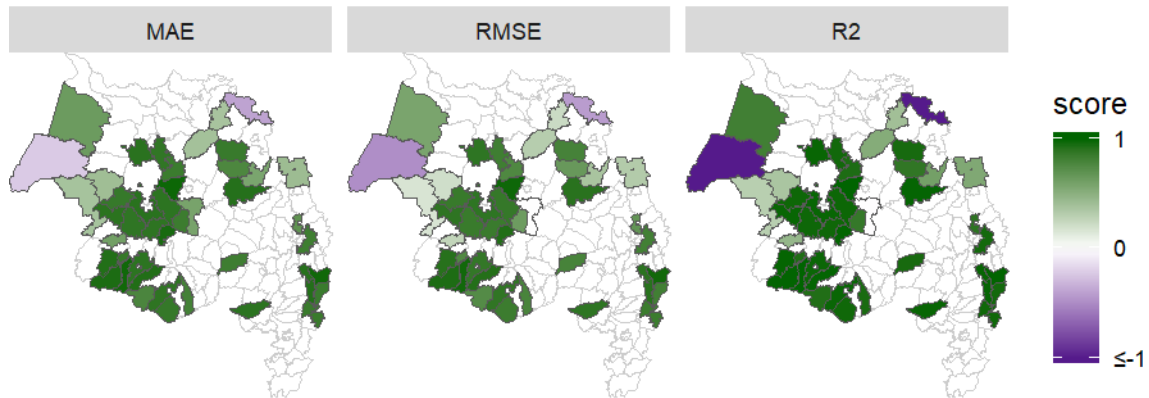
7 Weeks into the Future



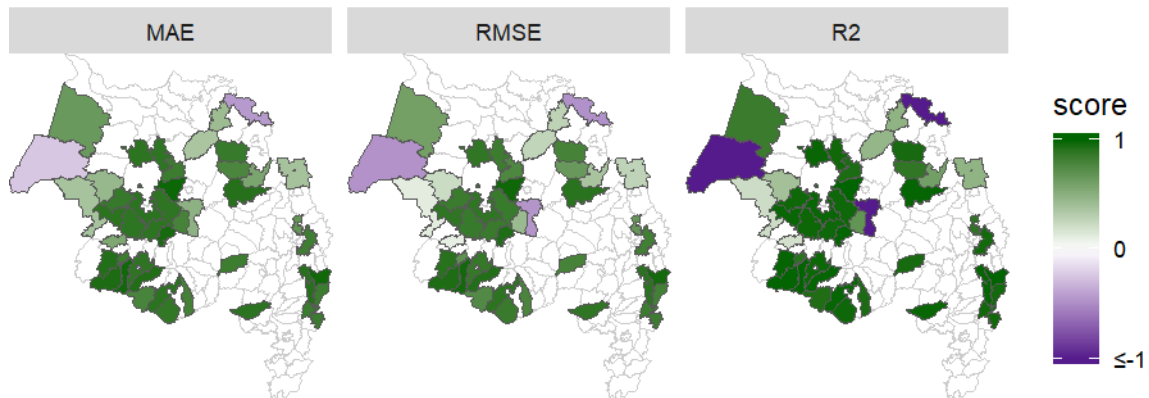
8 Weeks into the Future



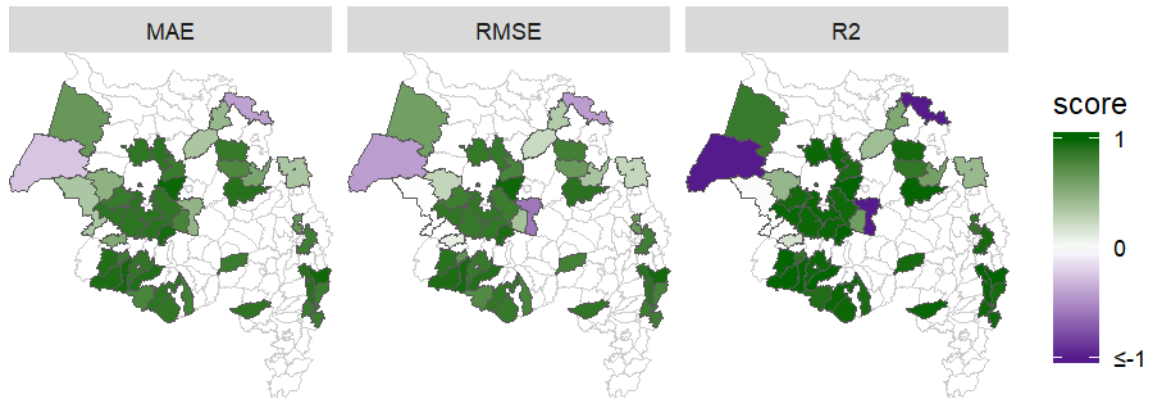
9 Weeks into the Future



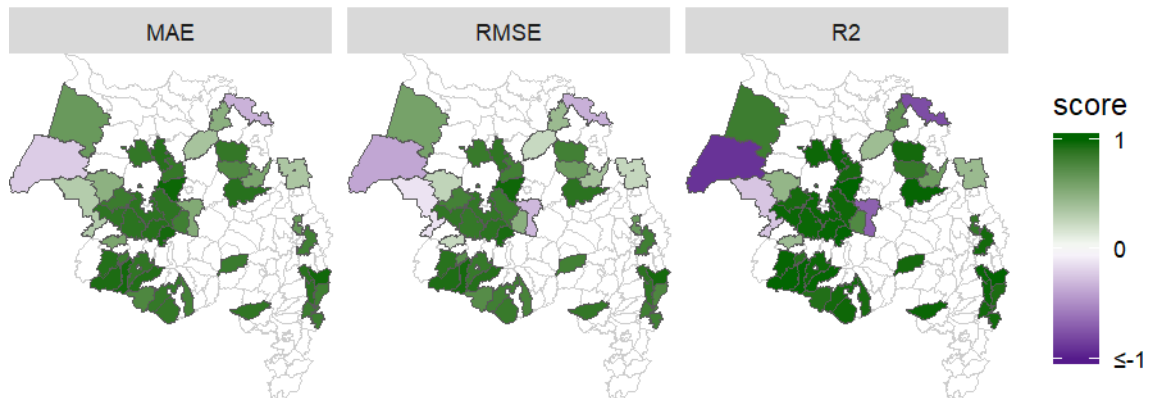
10 Weeks into the Future



11 Weeks into the Future

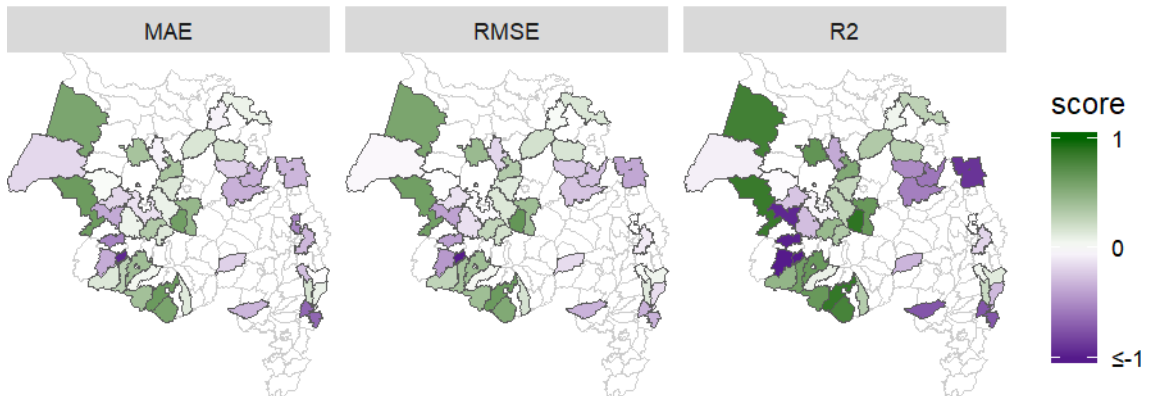


12 Weeks into the Future

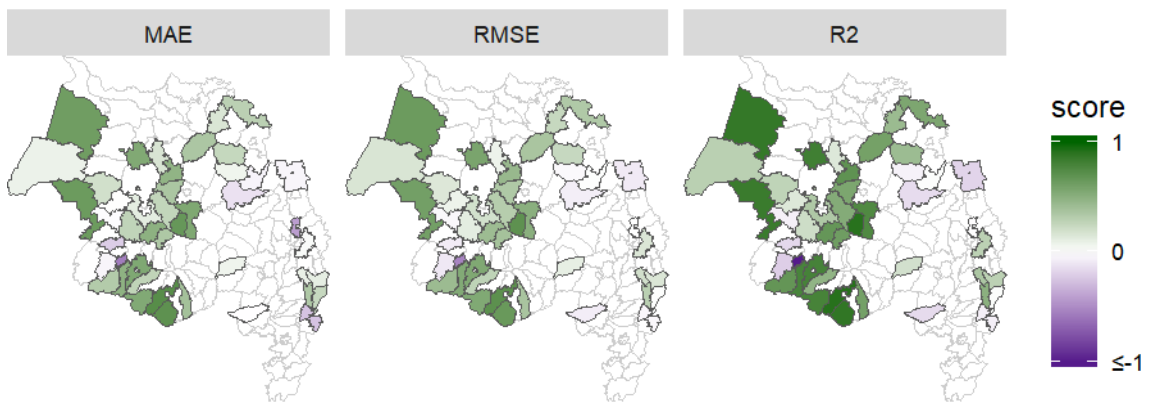


2.2 Persistence

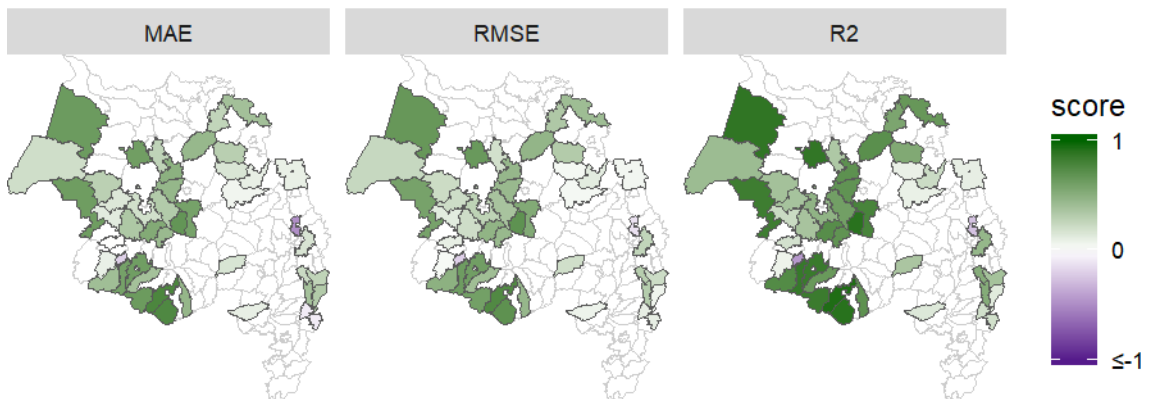
1 Weeks into the Future



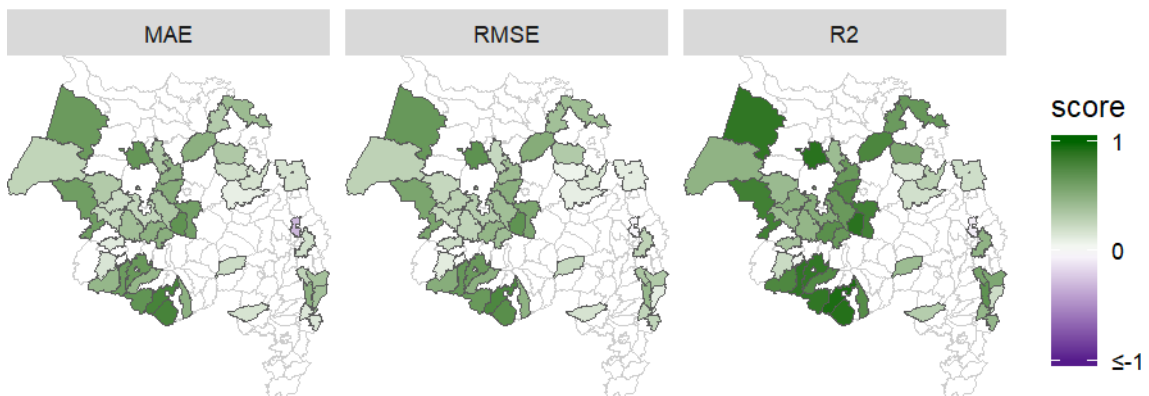
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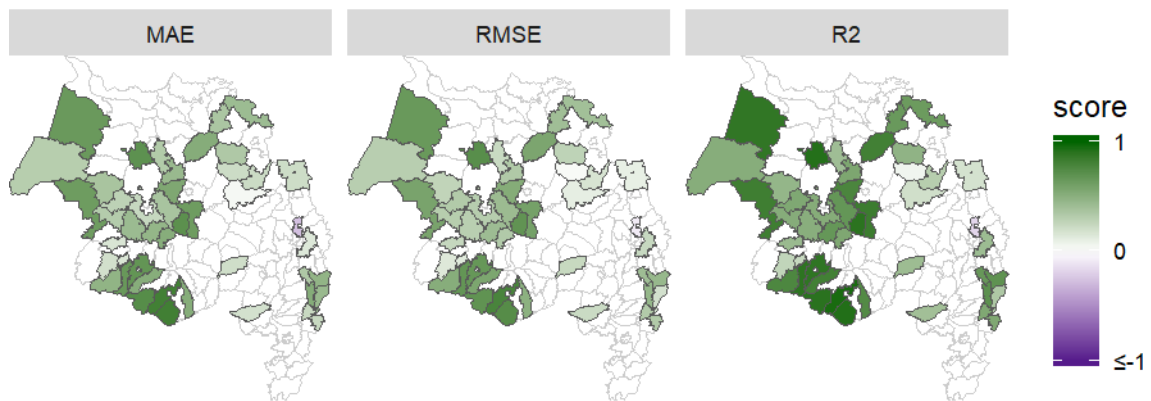
3 Weeks into the Future



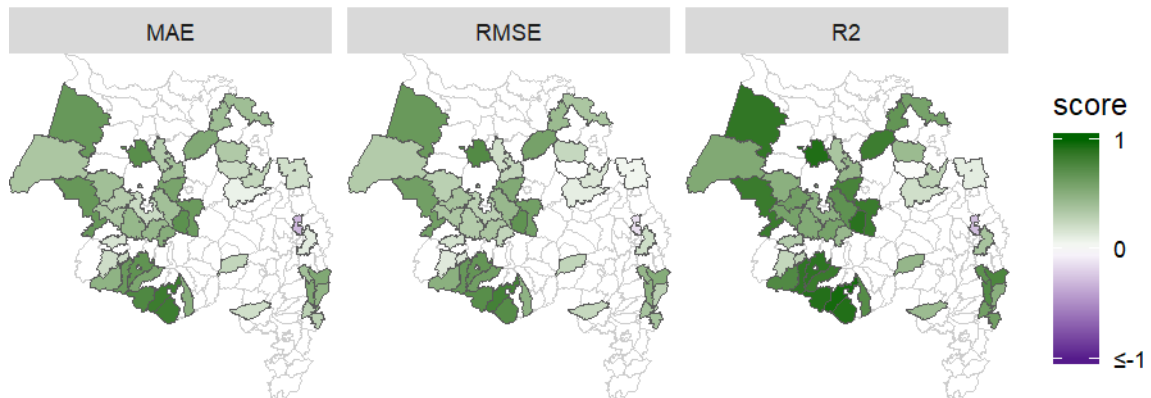
4 Weeks into the Future



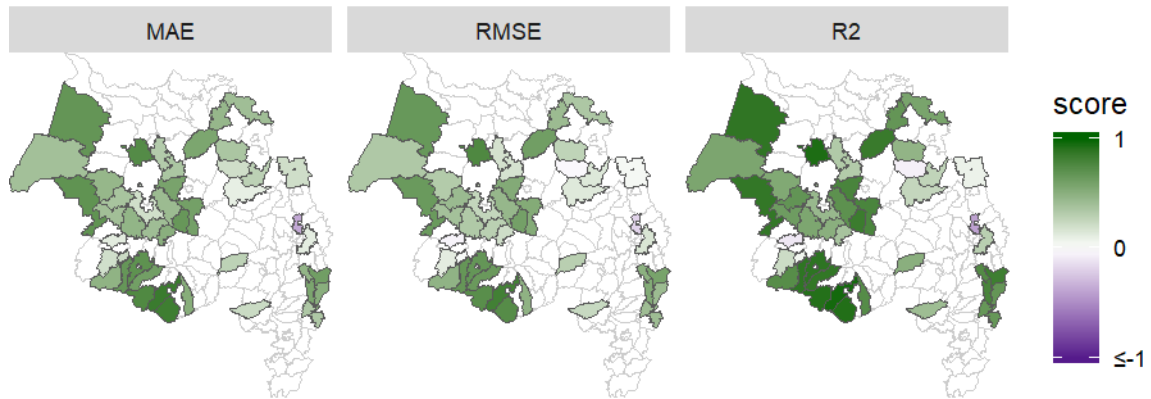
5 Weeks into the Future



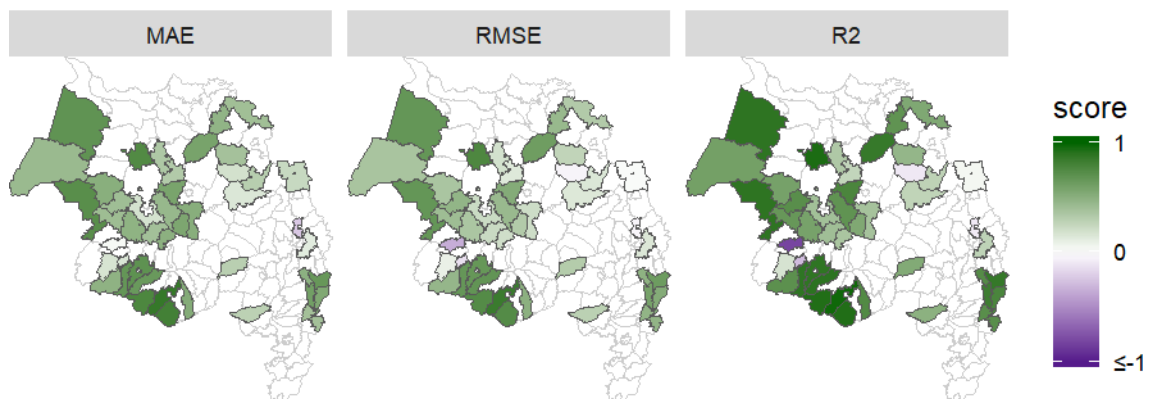
6 Weeks into the Future



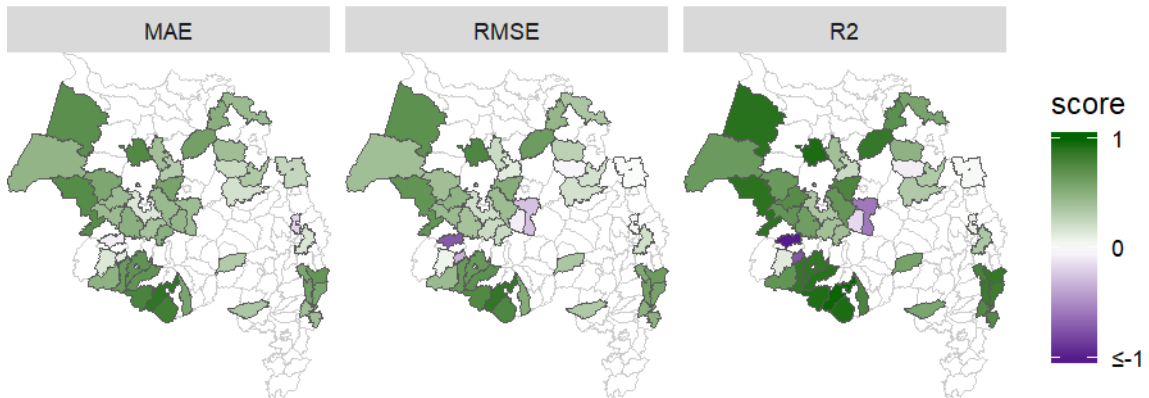
7 Weeks into the Future



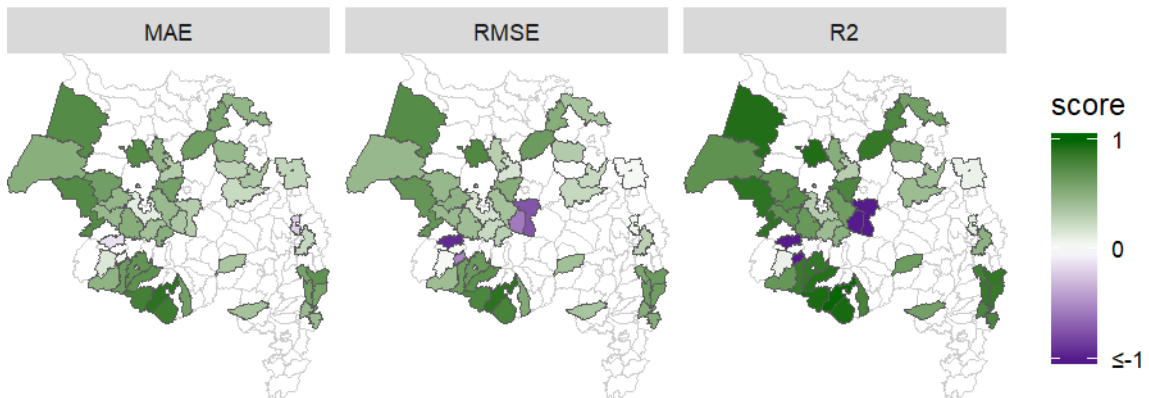
8 Weeks into the Future



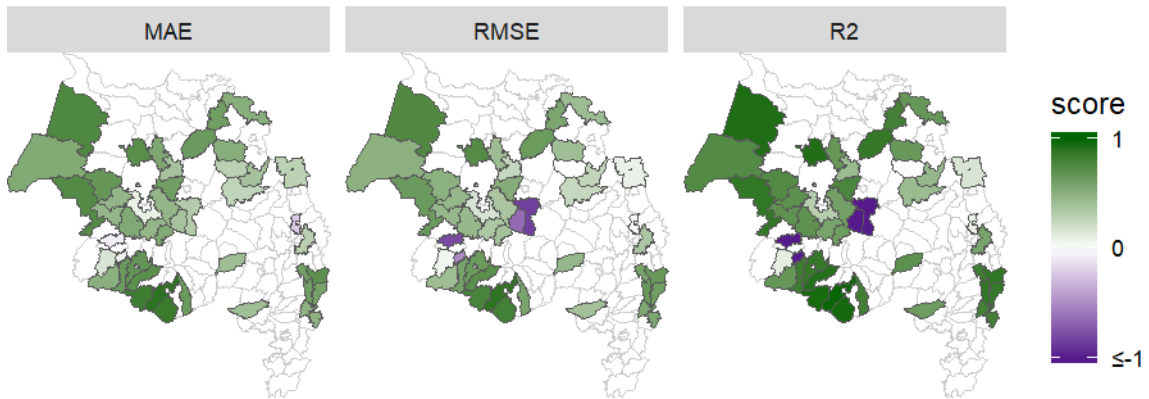
9 Weeks into the Future



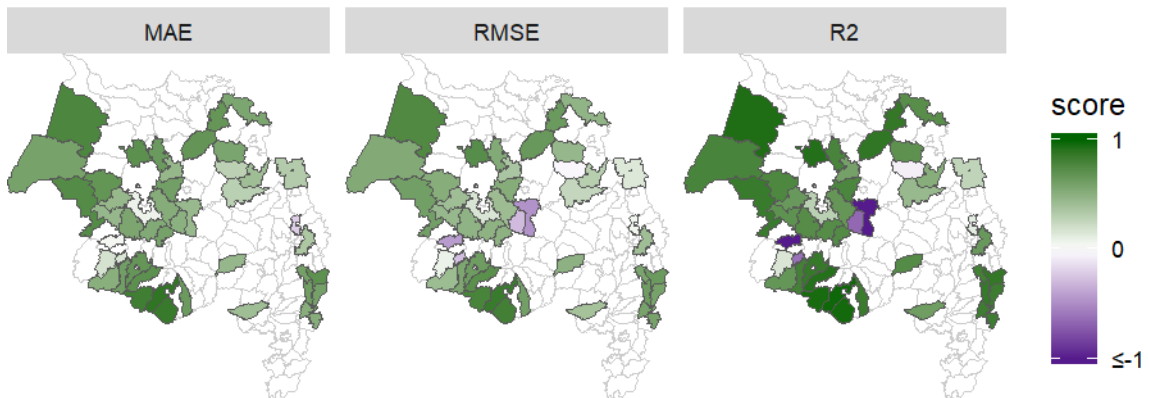
10 Weeks into the Future



11 Weeks into the Future

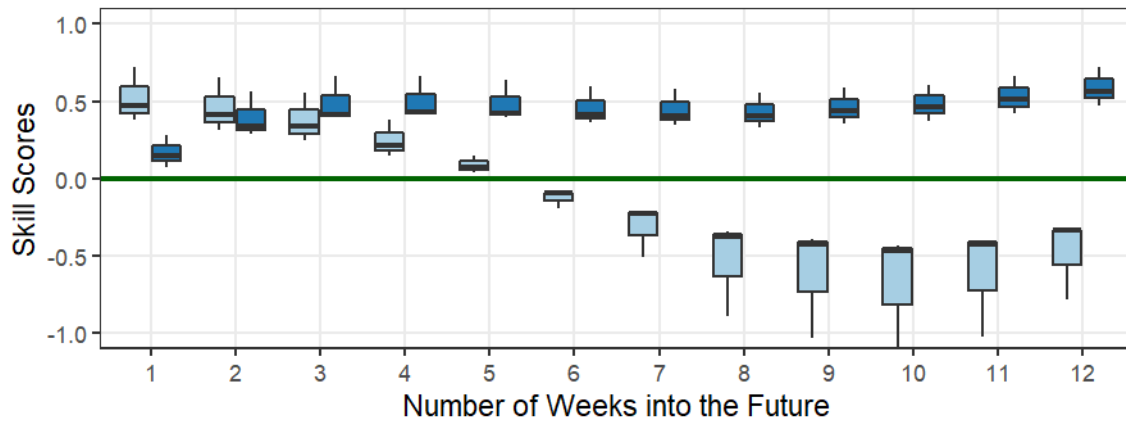


12 Weeks into the Future



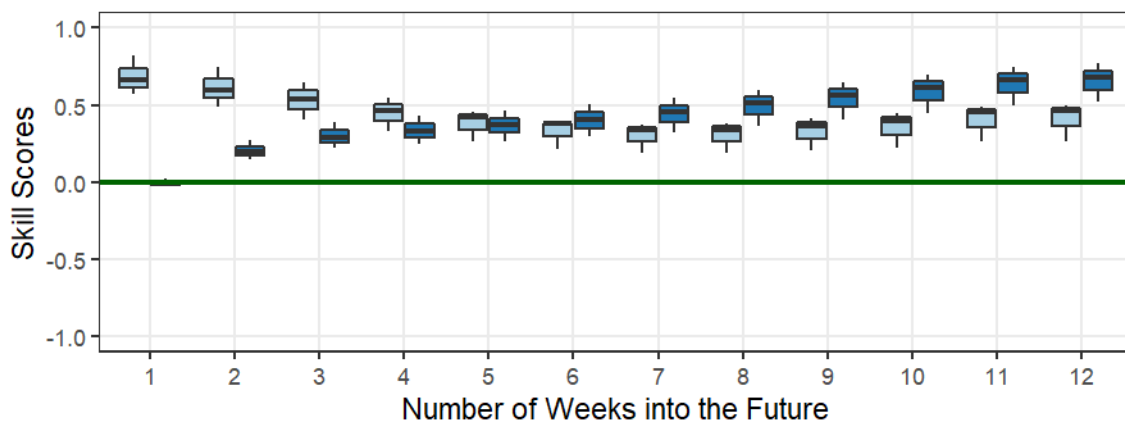
3 Skill per Woreda

Abargelie



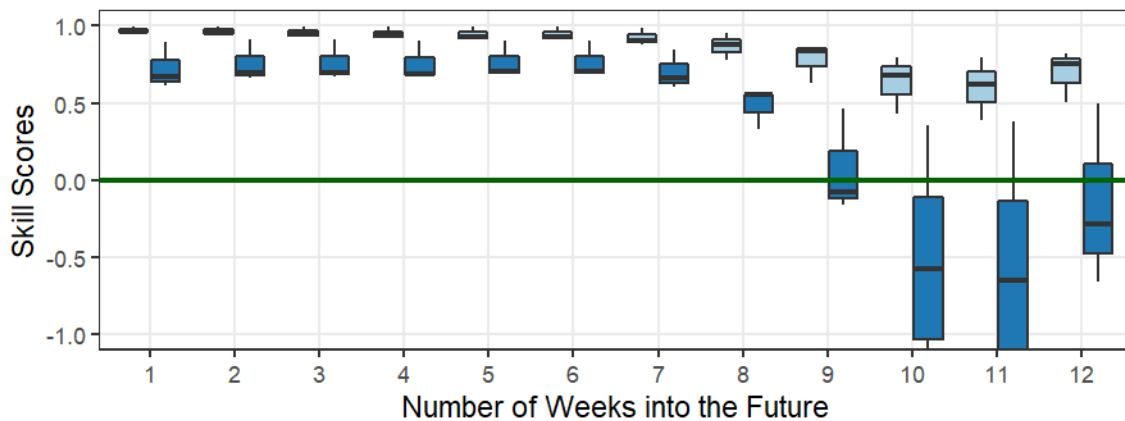
Compared to Naïve Model Average Week of Year Persistence

Alefa

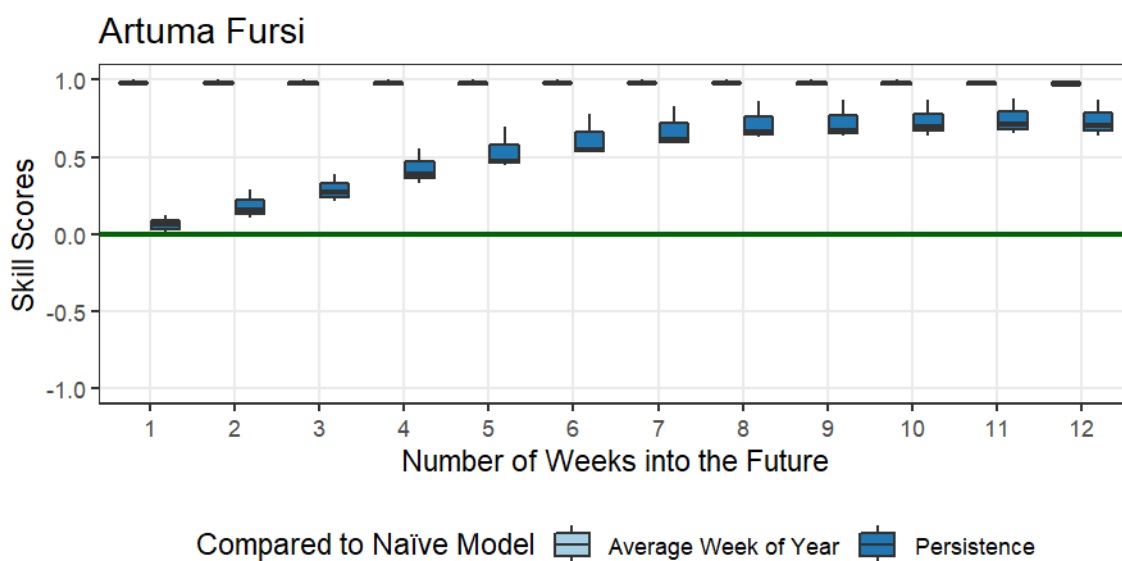
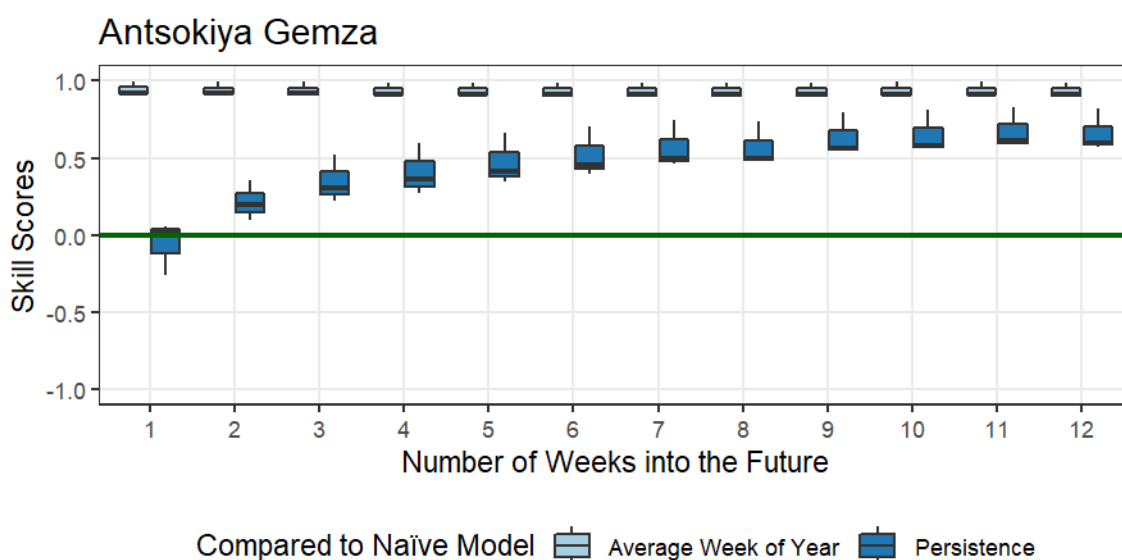
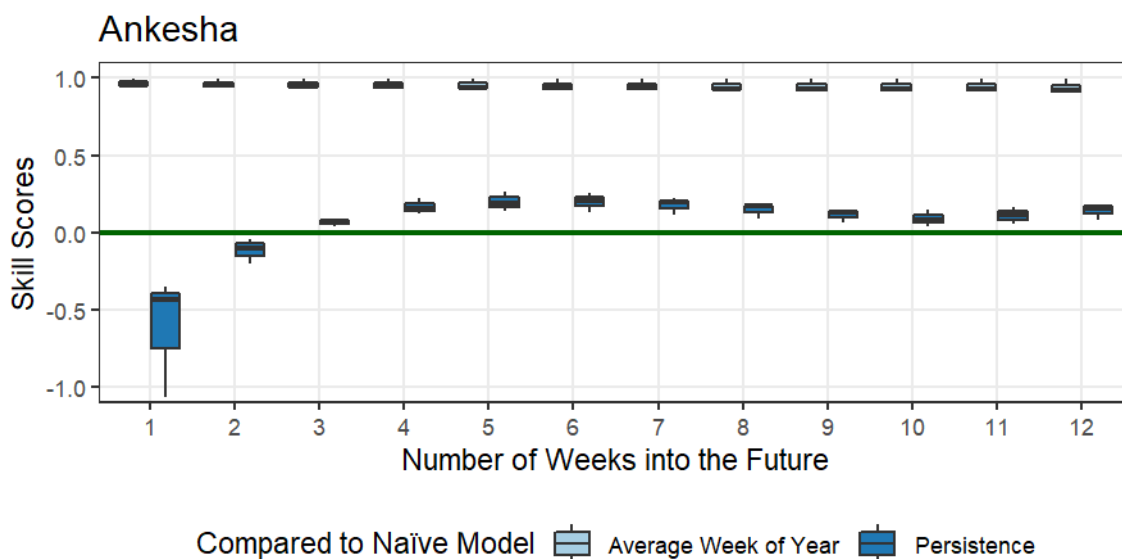


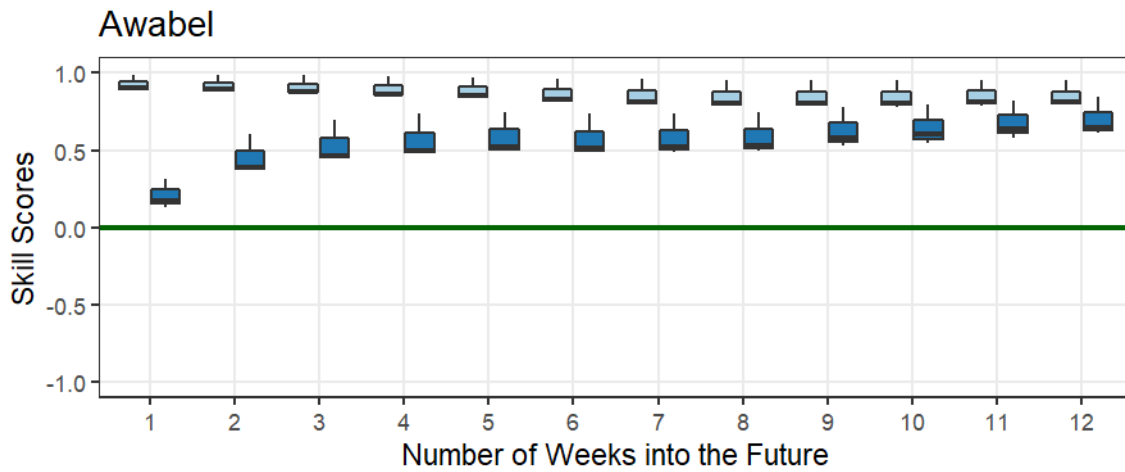
Compared to Naïve Model Average Week of Year Persistence


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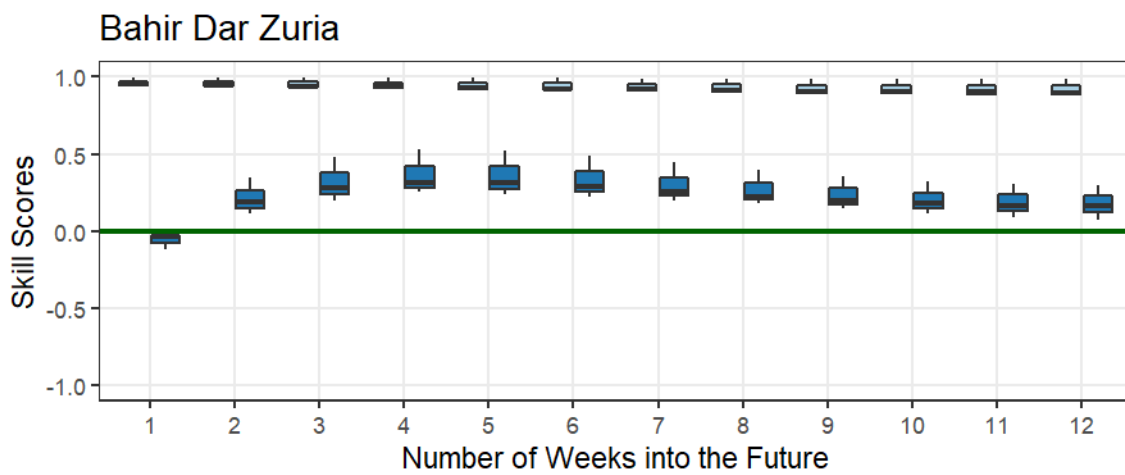




Compared to Naïve Model Average Week of Year Persistence

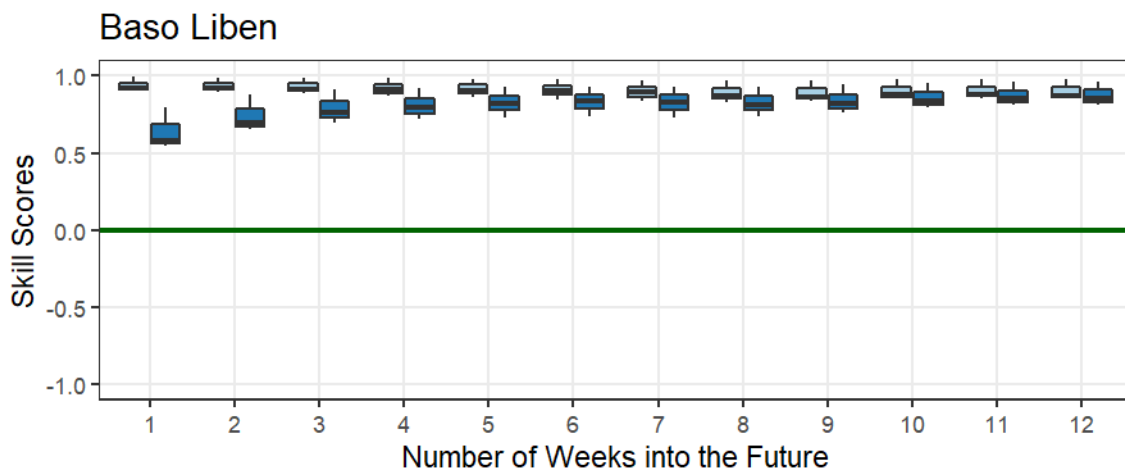





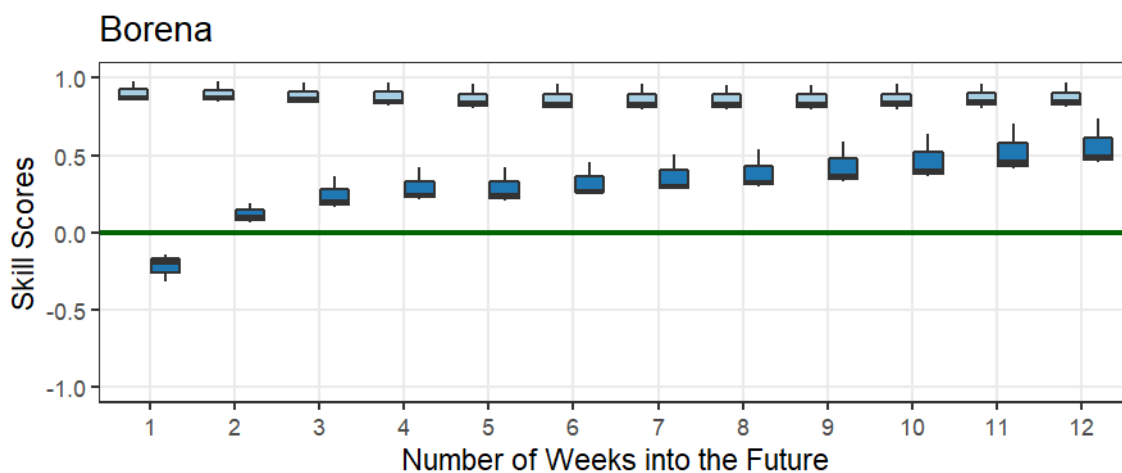
Compared to Naïve Model  Average Week of Year  Persistence



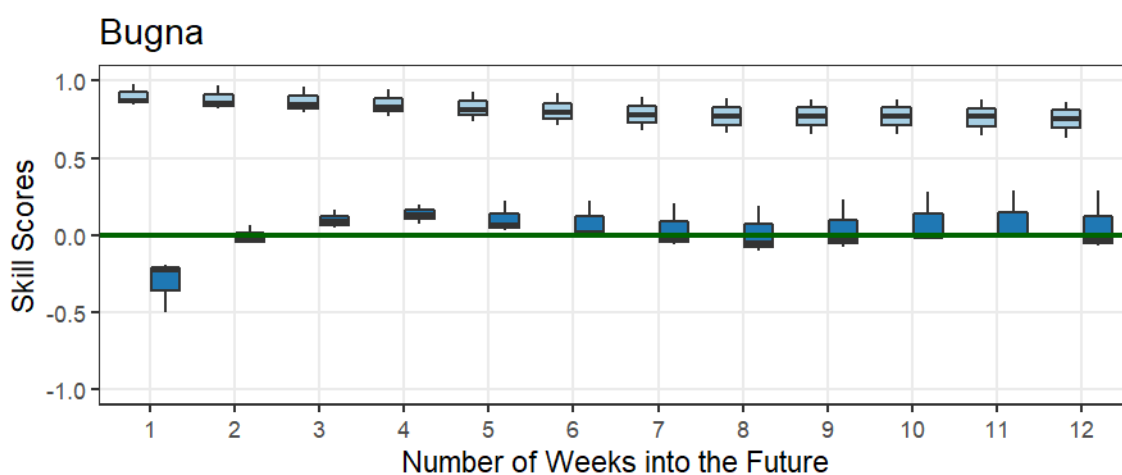
Compared to Naïve Model  Average Week of Year  Persistence



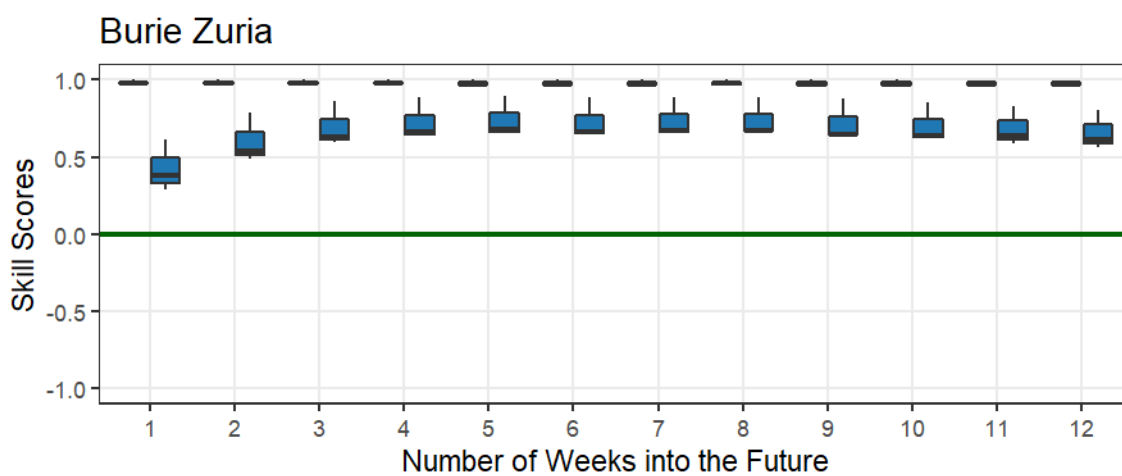
Compared to Naïve Model  Average Week of Year  Persistence



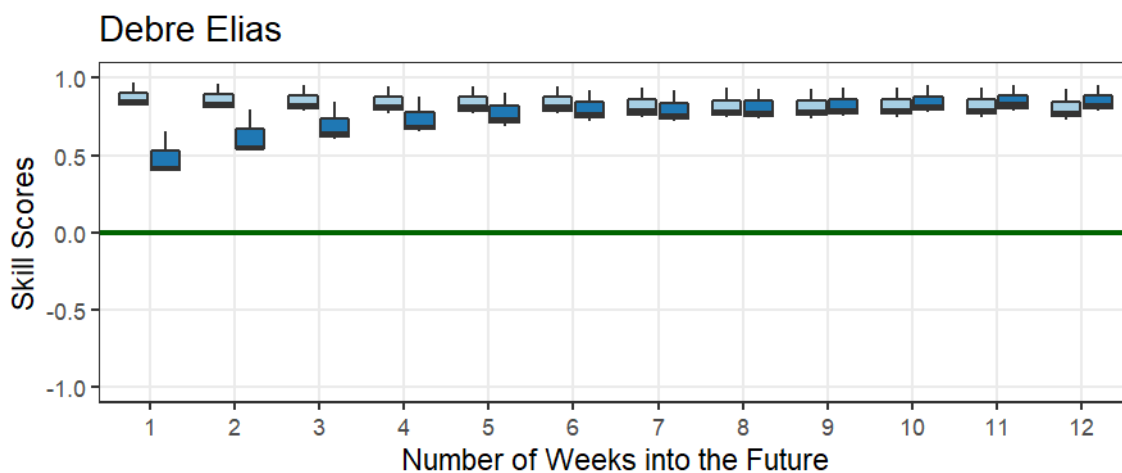
Compared to Naïve Model Average Week of Year Persistence




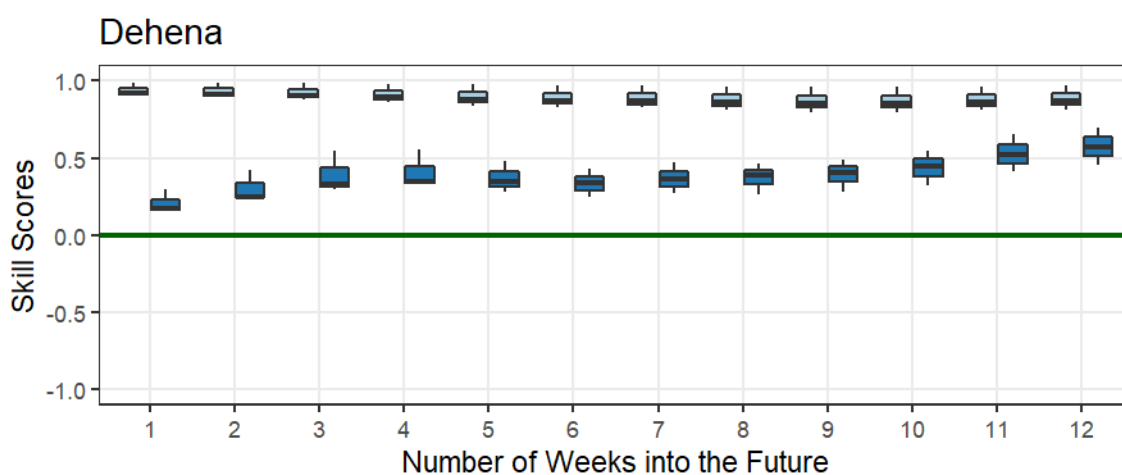
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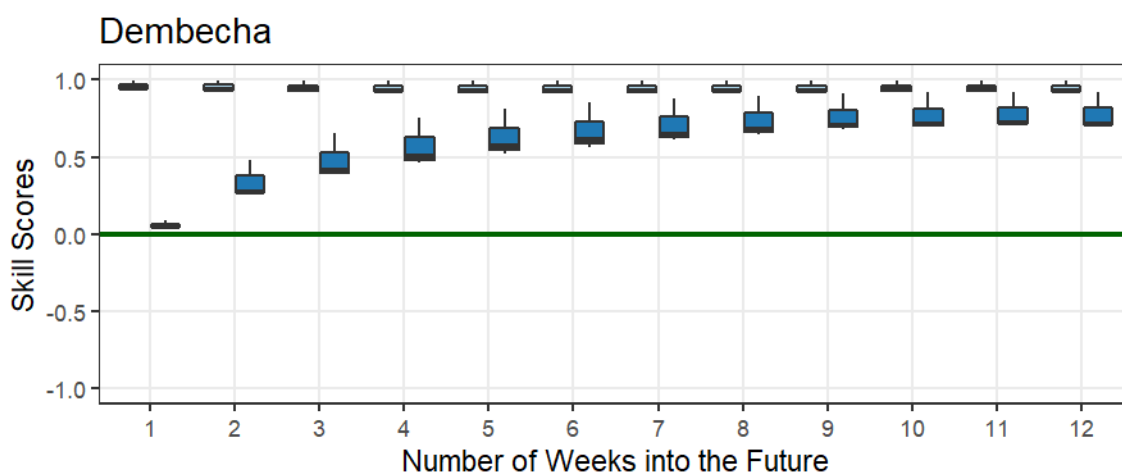
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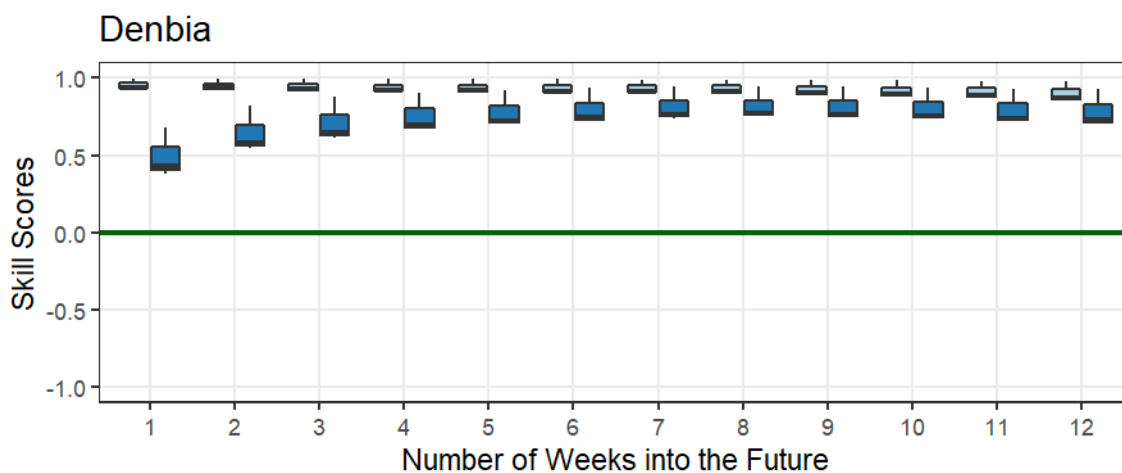
Compared to Naïve Model  Average Week of Year  Persistence




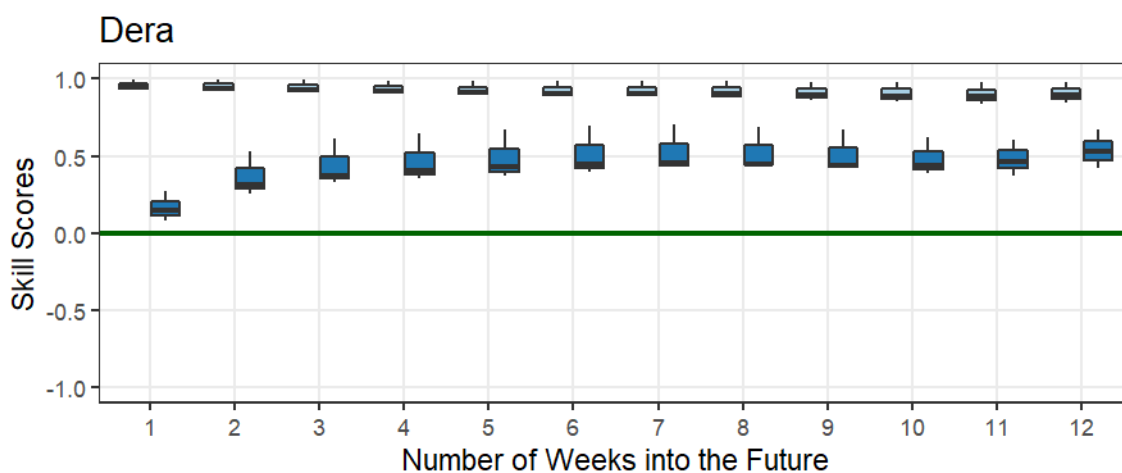
Compared to Naïve Model  Average Week of Year  Persistence





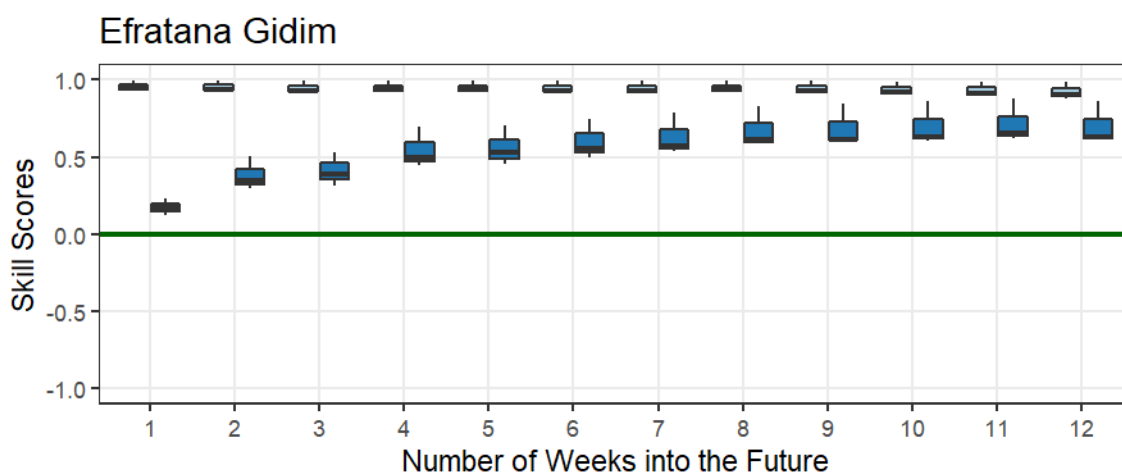
Compared to Naïve Model  Average Week of Year  Persistence





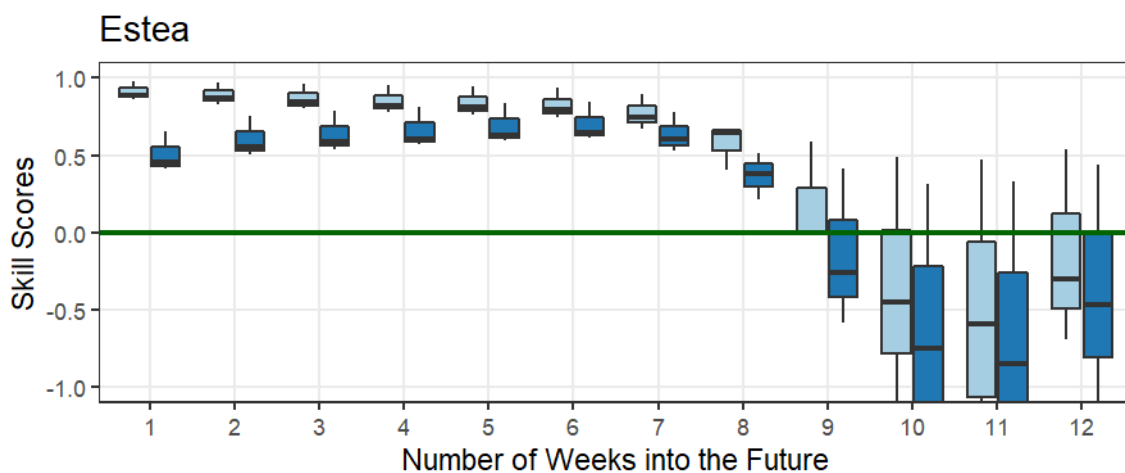
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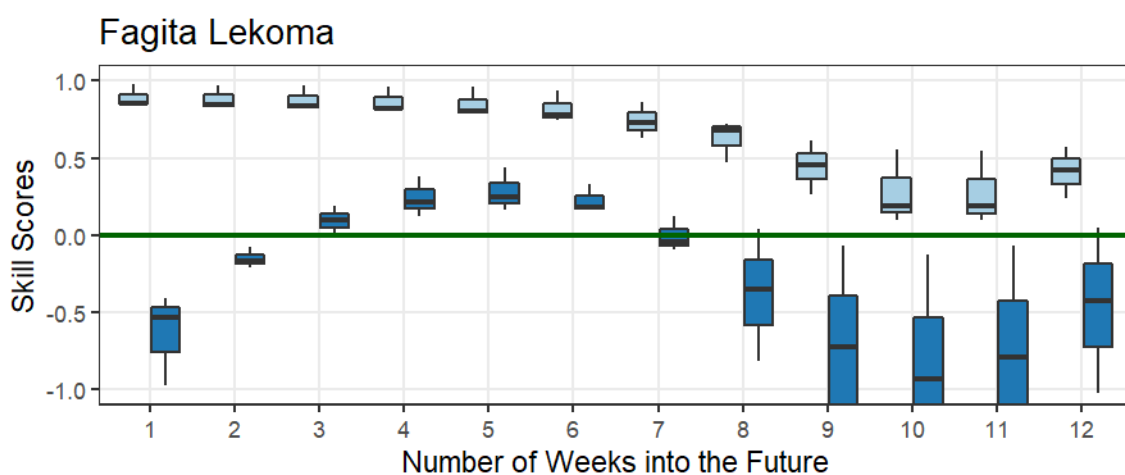
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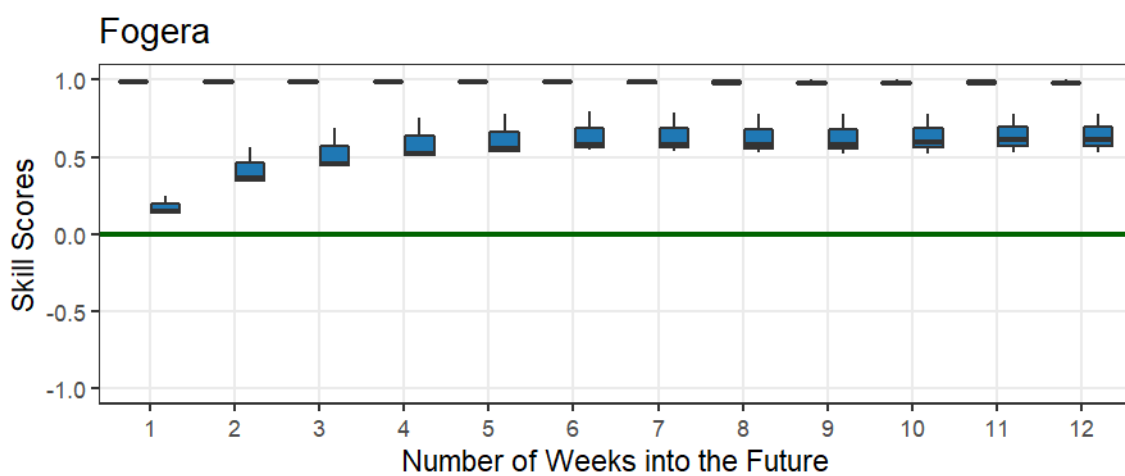
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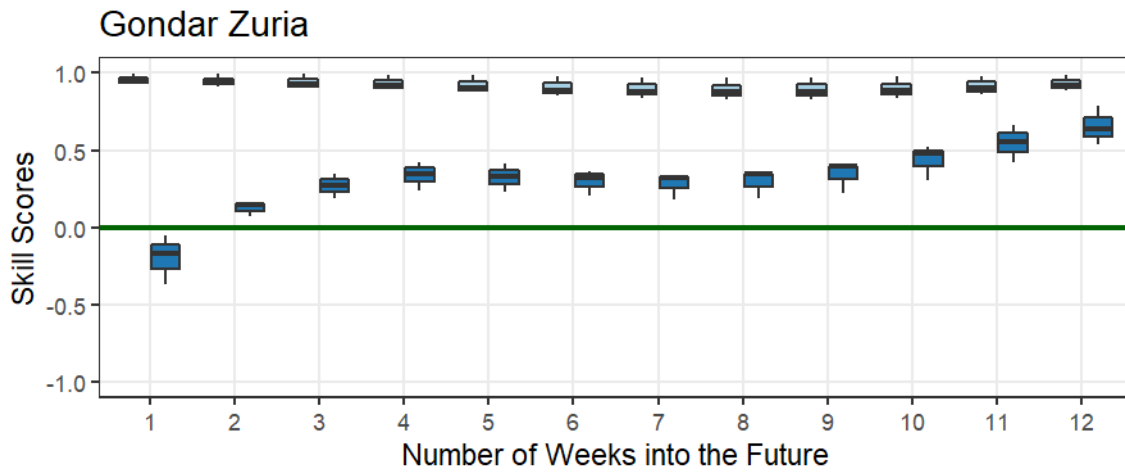
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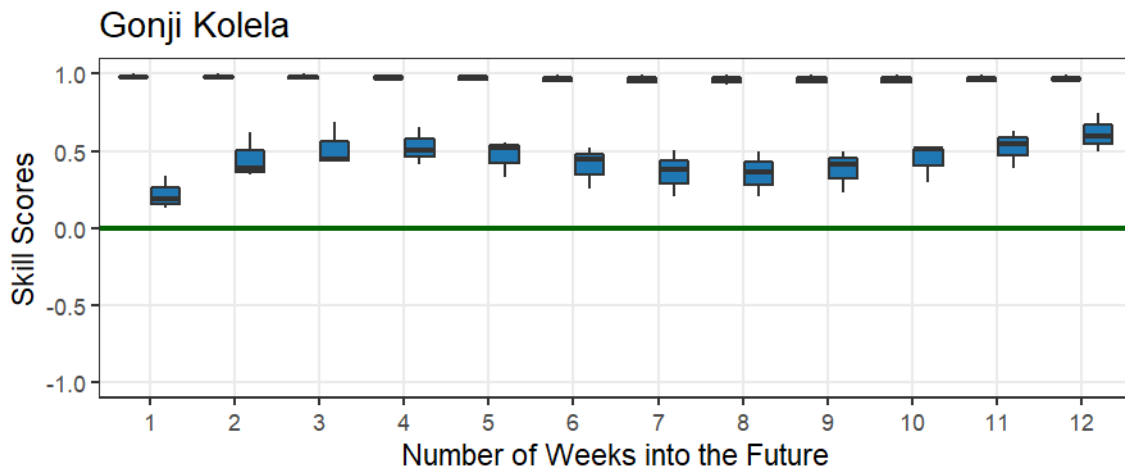
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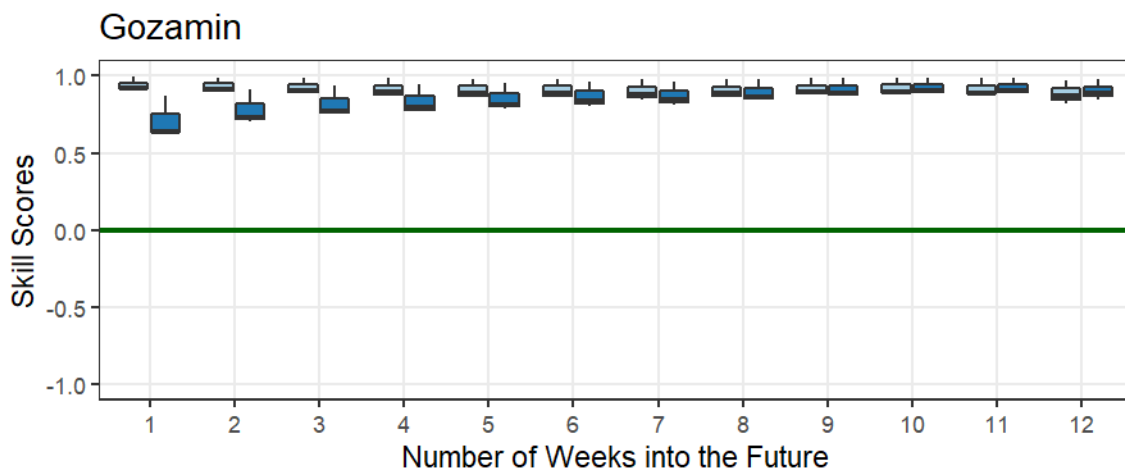
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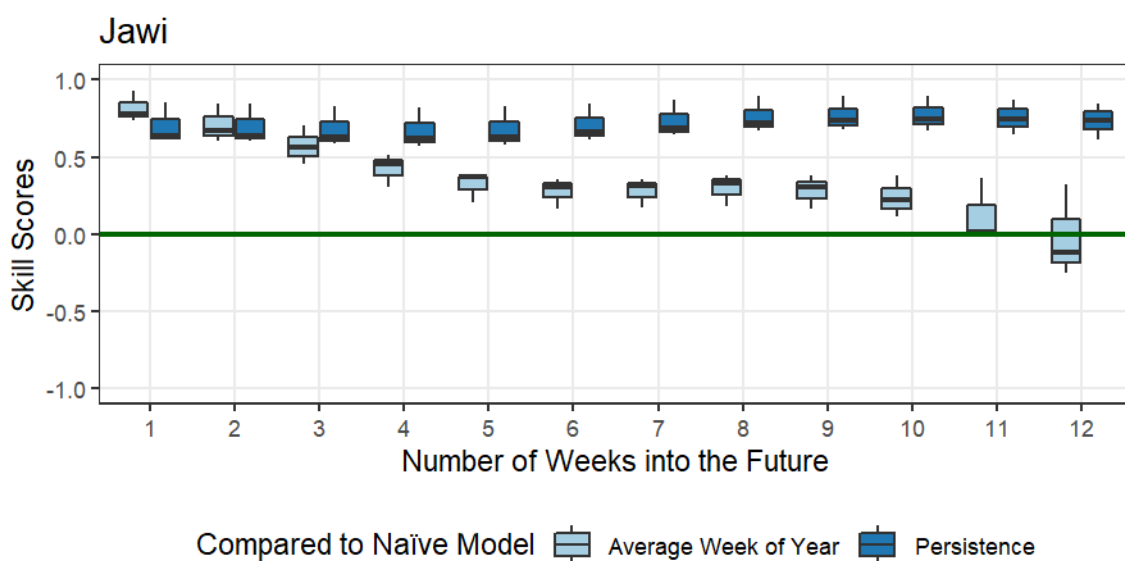
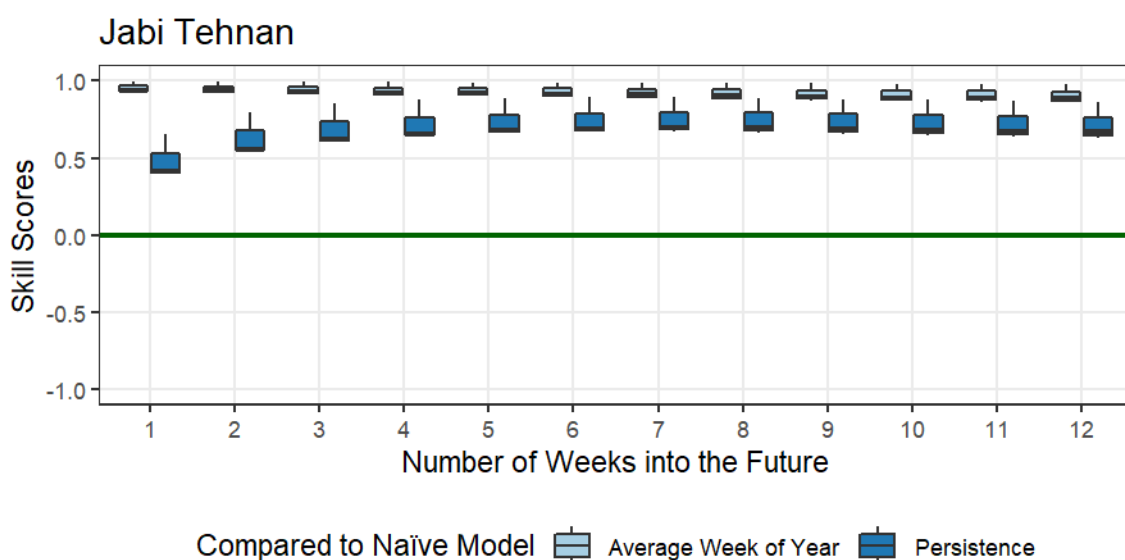
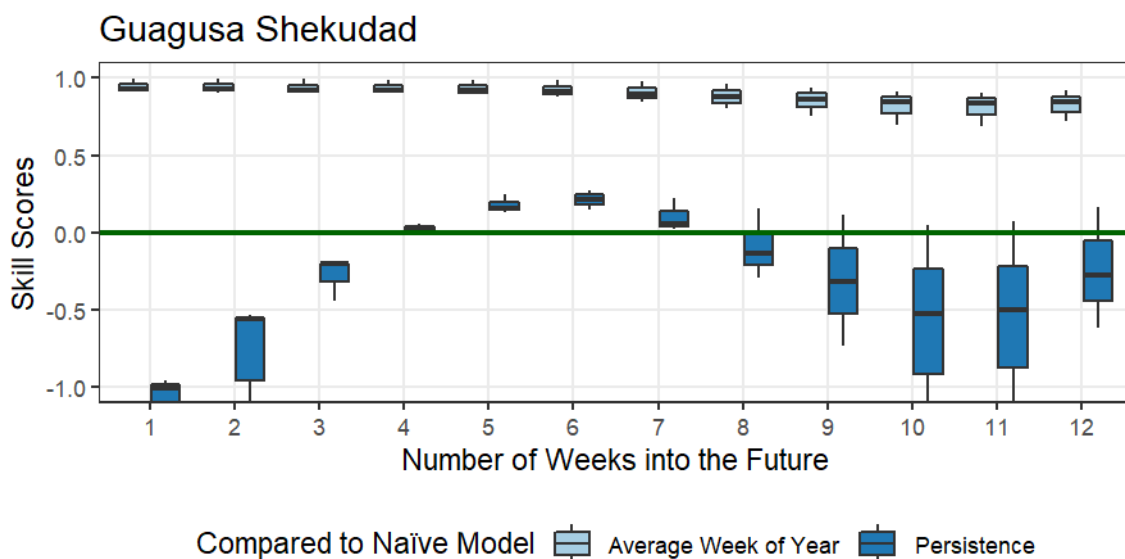
Compared to Naïve Model Average Week of Year Persistence

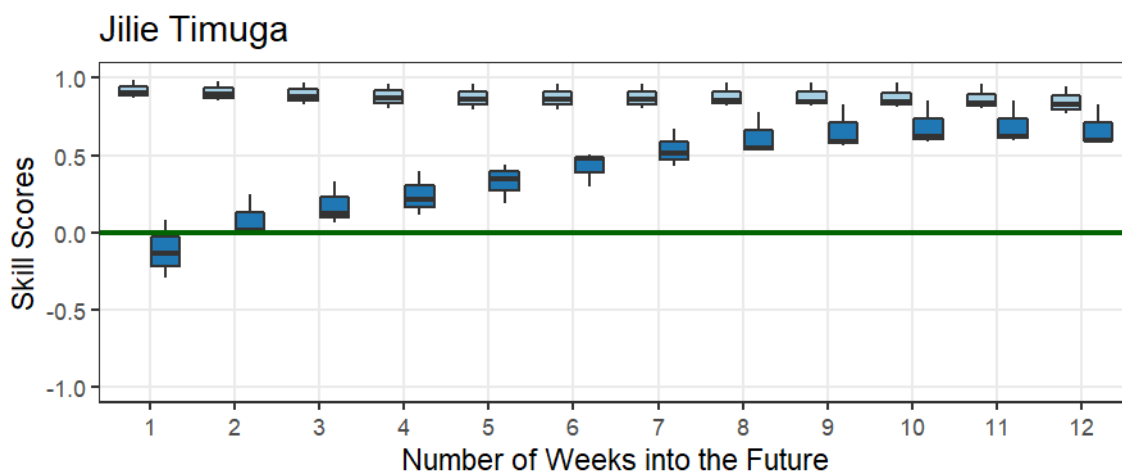


Compared to Naïve Model Average Week of Year Persistence

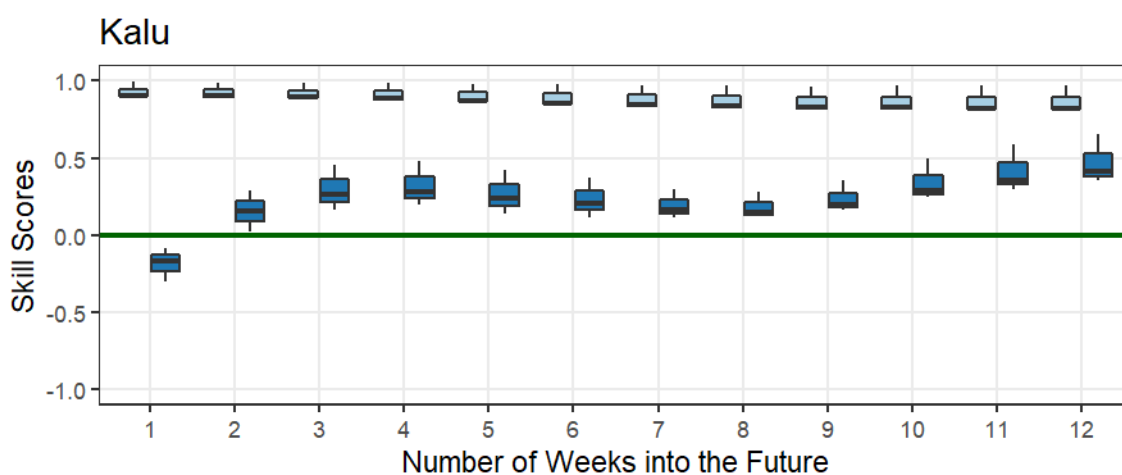


Compared to Naïve Model Average Week of Year Persistence

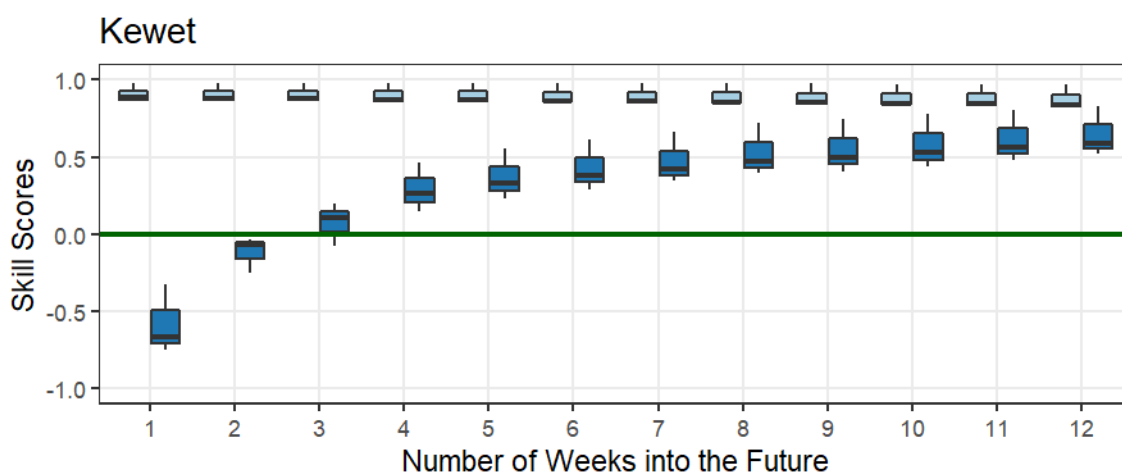




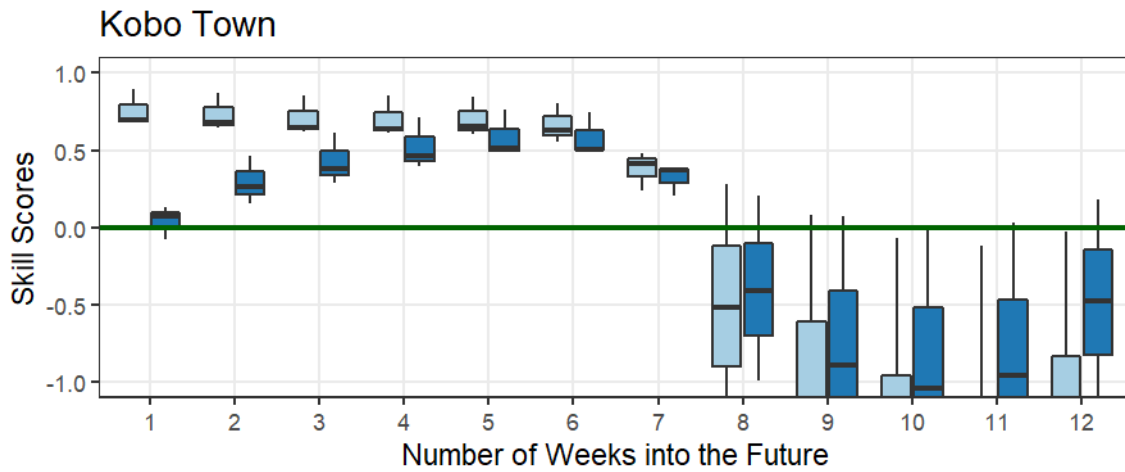
Compared to Naïve Model Average Week of Year Persistence





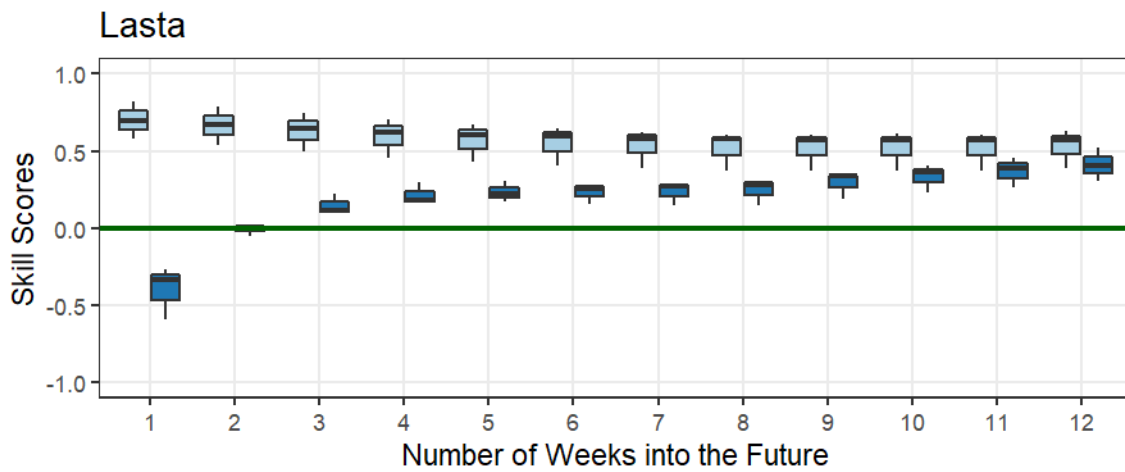
Compared to Naïve Model Average Week of Year Persistence





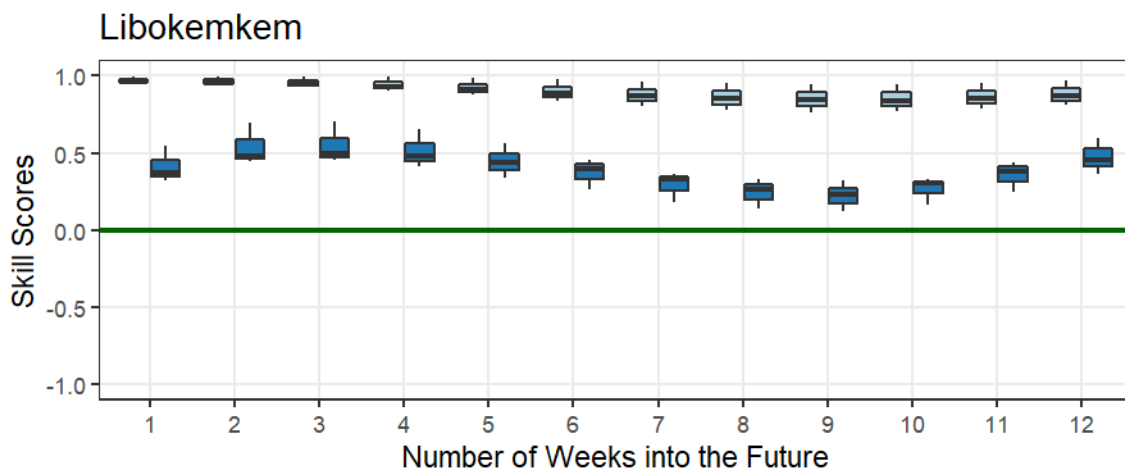
Compared to Naïve Model Average Week of Year Persistence





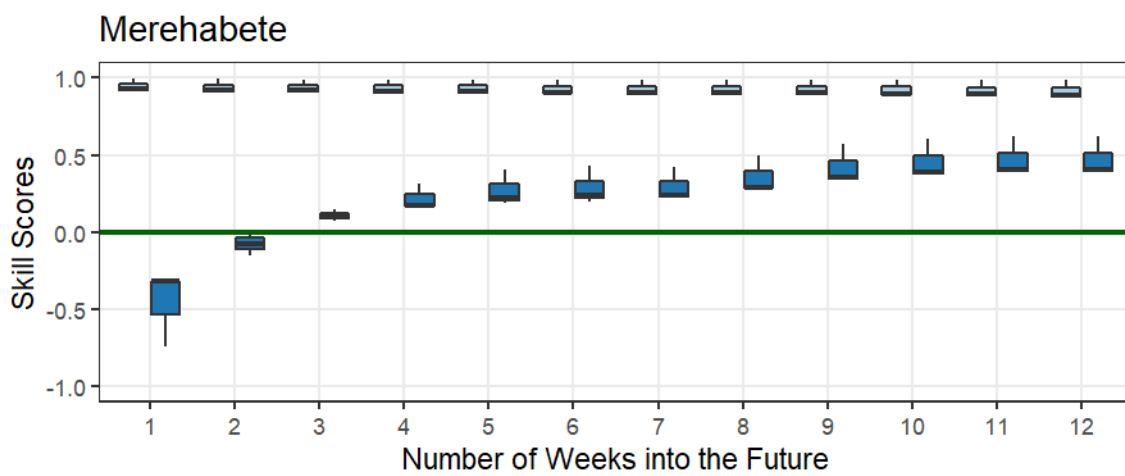
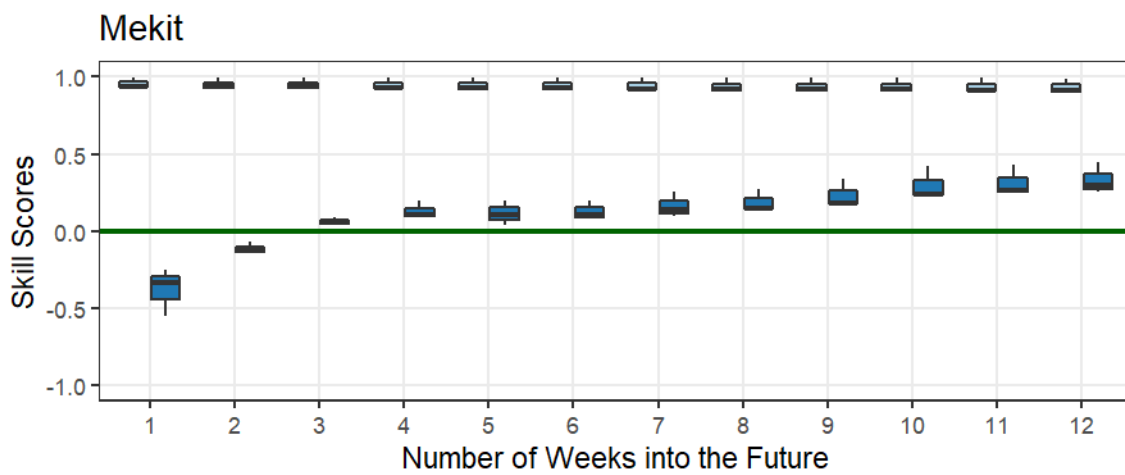
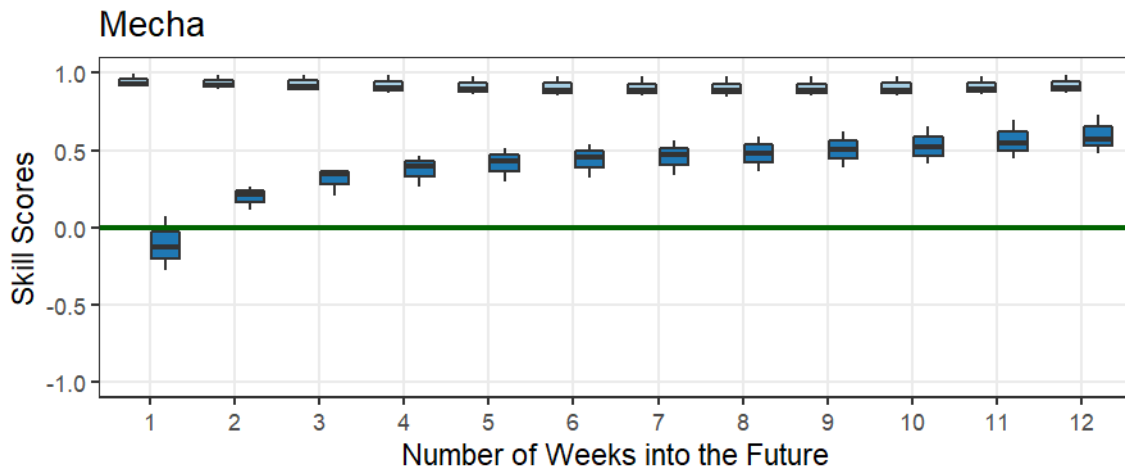
Compared to Naïve Model  Average Week of Year  Persistence

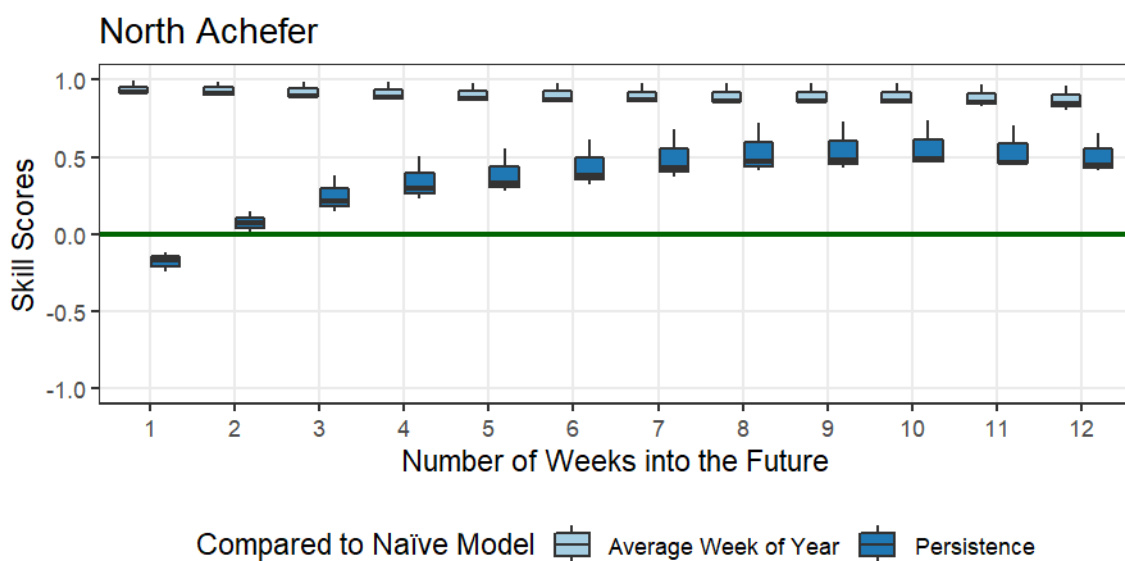
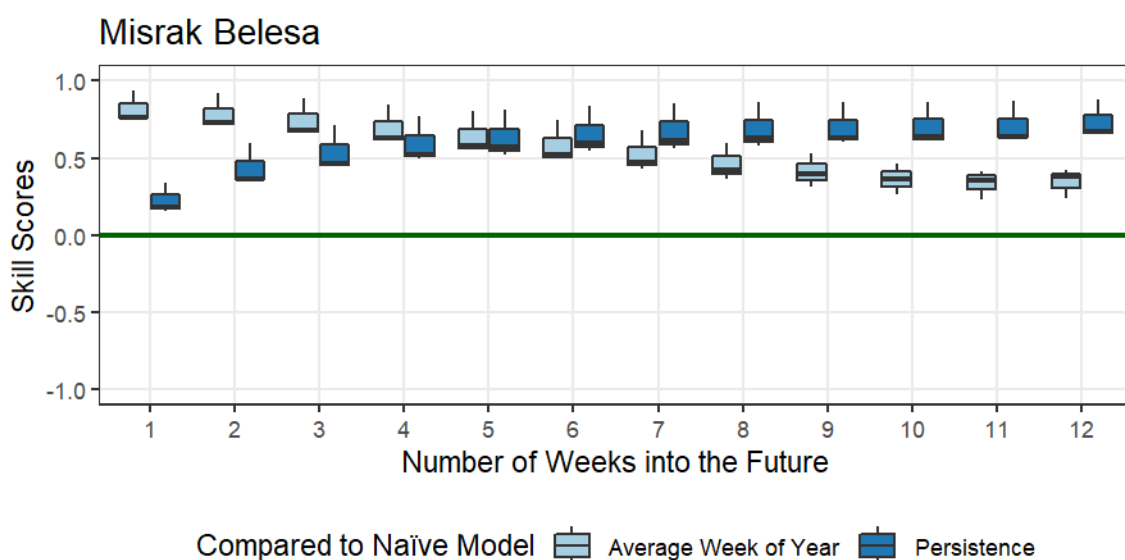
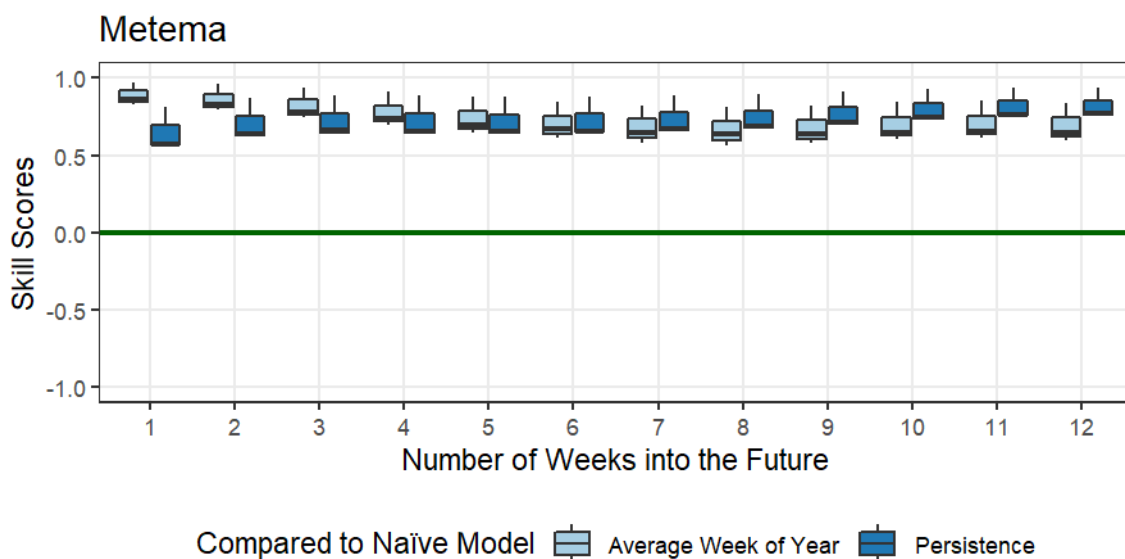


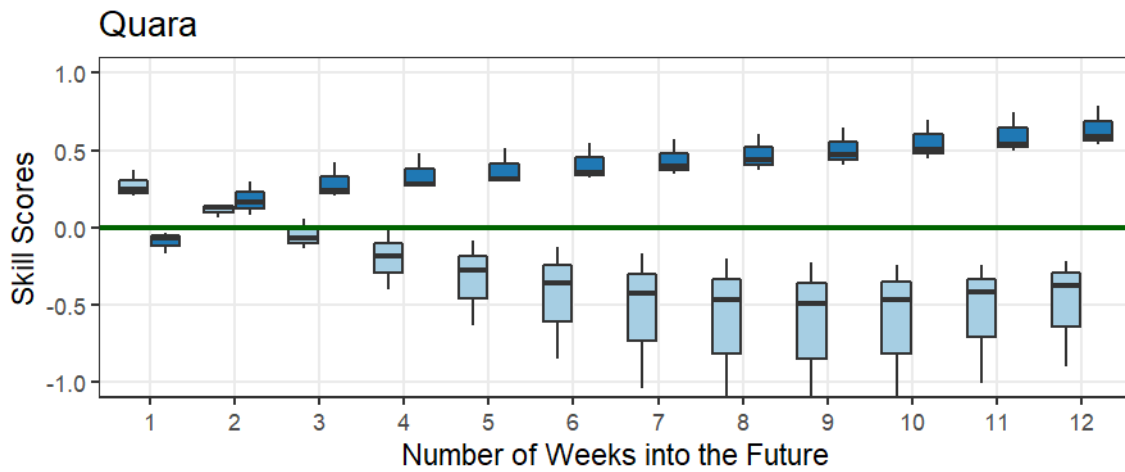
Compared to Naïve Model  Average Week of Year  Persistence




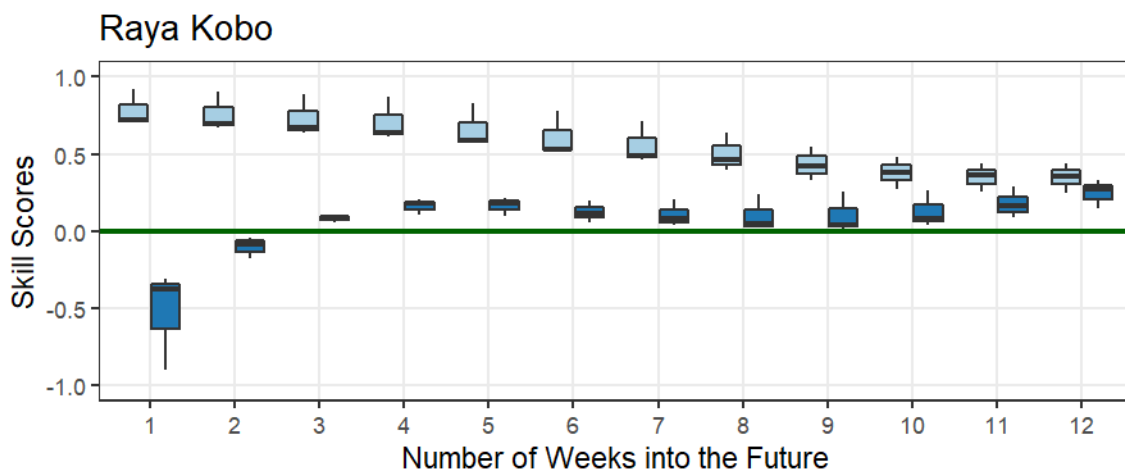
Compared to Naïve Model  Average Week of Year  Persistence





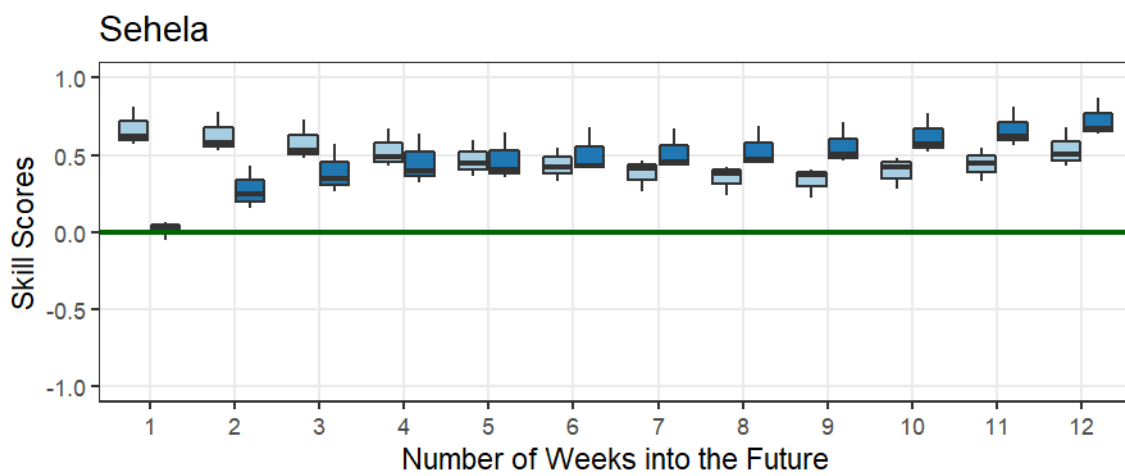






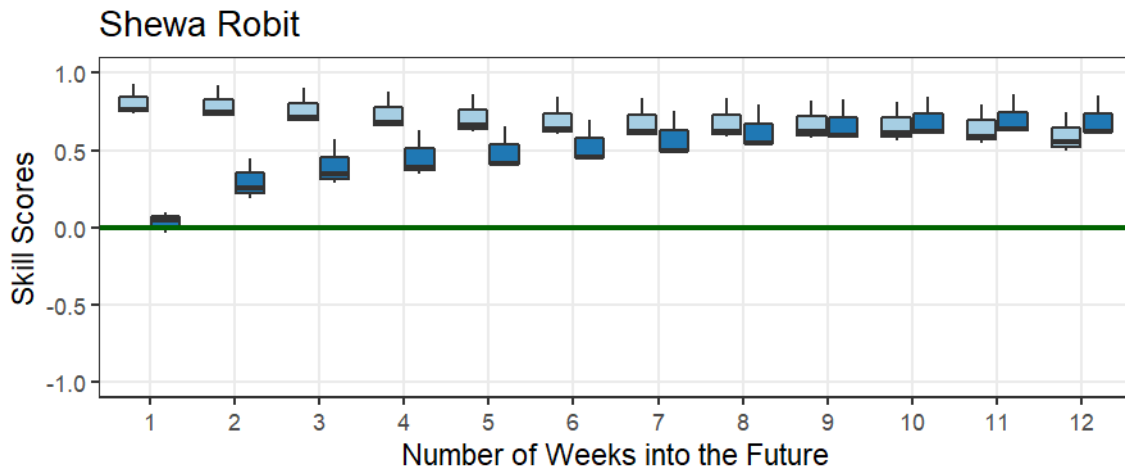
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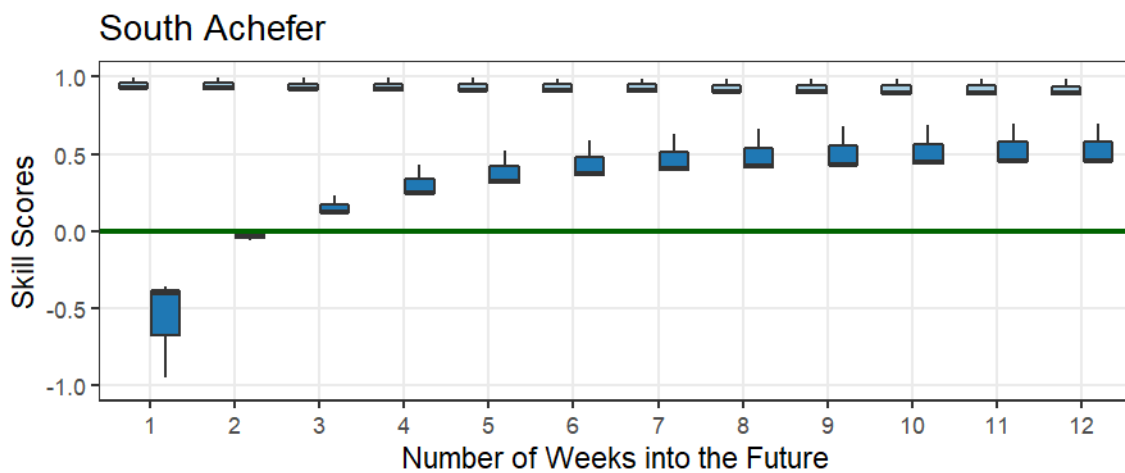
Compared to Naïve Model  Average Week of Year  Persistence




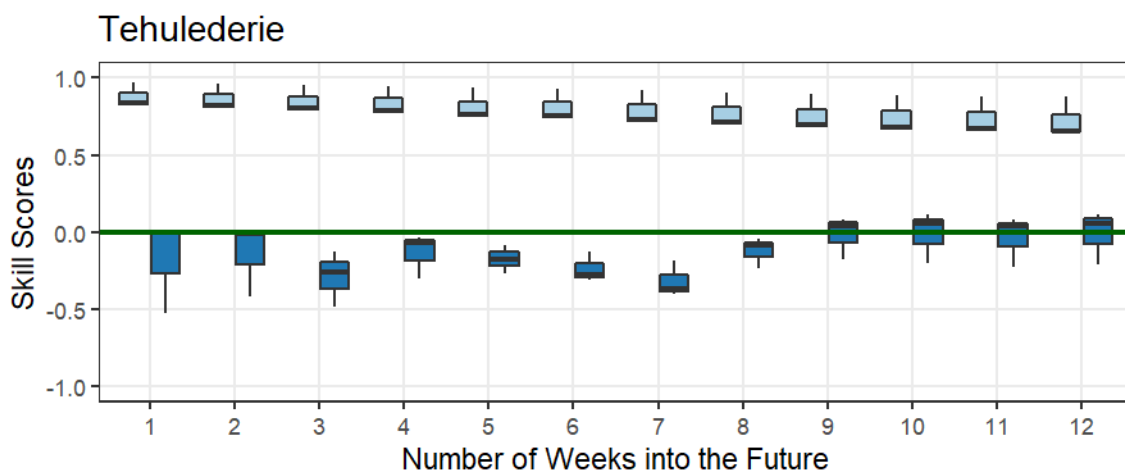
Compared to Naïve Model  Average Week of Year  Persistence





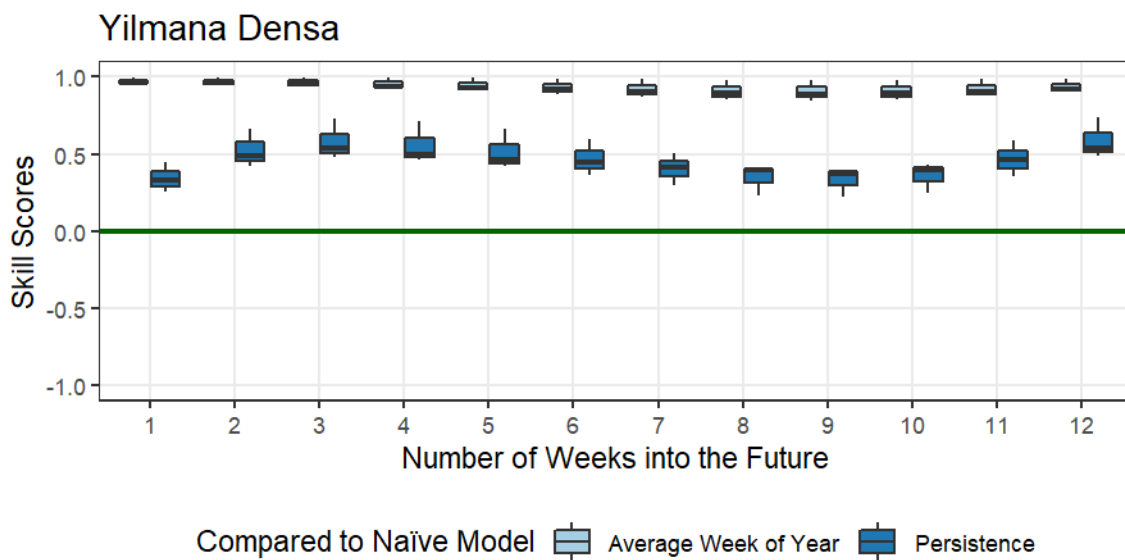
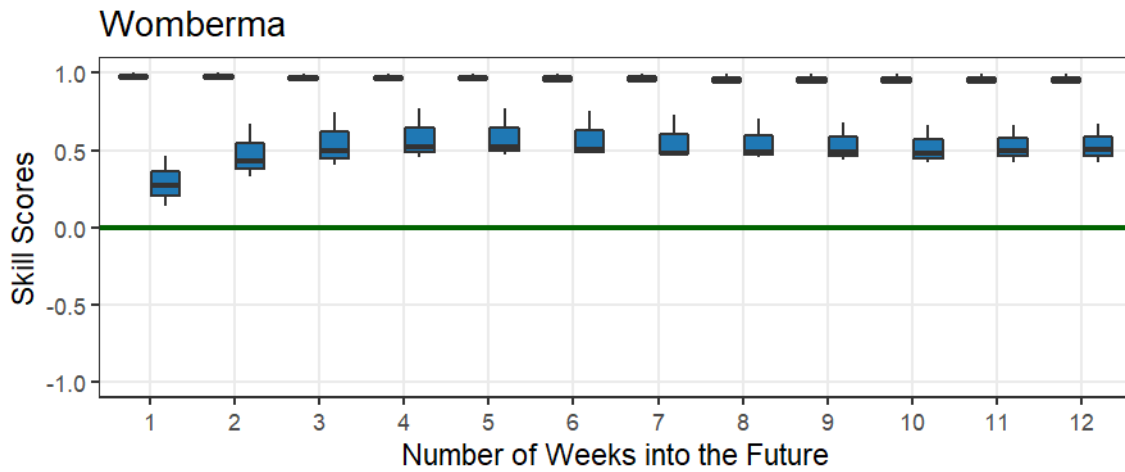
Compared to Naïve Model  Average Week of Year  Persistence



Compared to Naïve Model  Average Week of Year  Persistence



Compared to Naïve Model  Average Week of Year  Persistence



4 Accuracy Statistics

4.1 Overall Model

| Week Ahead | MAE | RMSE | R2 |
|------------|------|------|------|
| 1 | 5.8 | 13.5 | 0.98 |
| 2 | 6.8 | 16.3 | 0.98 |
| 3 | 7.8 | 19.5 | 0.97 |
| 4 | 8.8 | 22.8 | 0.95 |
| 5 | 9.7 | 25.5 | 0.94 |
| 6 | 10.4 | 27.5 | 0.93 |
| 7 | 11.1 | 29.1 | 0.92 |
| 8 | 11.7 | 31.0 | 0.91 |
| 9 | 12.2 | 33.7 | 0.90 |
| 10 | 12.6 | 37.1 | 0.87 |
| 11 | 12.6 | 38.6 | 0.86 |
| 12 | 12.5 | 36.9 | 0.87 |

This table contains the raw accuracy statistic values for the forecast model overall for each week forecast into the future. There are three accuracy statistics used: Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and an R2 (variance explained). The validation was run with the assumption that there is a reporting lag of 0 weeks.