Summary Data and Results

Dataset	Frequency	Horizon	Number of Samples	Minimum training sample length
Prison	4 (quarterly)	8	3	24
Tourism	12 (monthly)	12	10	144
Wikipedia	7 (weekly)	7	10	324
Labour	4 (quarterly)	12	5	68

Error calculation

- Step 1 – For each time series in the hierarchy calculate the error metric (MSE, MAPE)

- Step 2 – Calculate the mean error across the time series in each level (this gives the mean error for each level)

- Step 3 – Calculate the overall error by getting the mean error across all time series errors we have in Step 1

- Step 4 – Repeat step 1-3 for all samples

- Step 5 – Calculate the mean error for each level and overall, across the samples

- Step 6 – Calculate the percentage improvement for each level and overall

Results Across Samples

Full Horizon (*In the full horizon ML reconciliation performs best for most 3 out of datasets when the base model is ETS. However, when the base forecasts are from ARIMA the ML reconciliation performs best only for the Tourism dataset*)

| Dataset	ARIMA	ETS
Prison	OLS Best ML Rank – 4 (Case 1 Lambda 1-4)	Case 1 Lambda 0.01-0.09
Tourism	Case 1 Lambda 0.01-5	Case 2 Lambda 1
Labour	OLS Best ML Rank – 4 (Case 2 Lambda 1)	Case 1 Lambda 0.01-0.09
Wikipedia	OLS Best ML Rank – 5 (Case 2 Lambda 0.1-0.9)	OLS Best ML Rank – 5 (Case 2 Lambda 1)

Short Horizon (*In the short horizon ML reconciliation performs best for most 3 out of datasets when the base model is ETS – similar observation as the full horizon. When the base forecasts are from ARIMA the ML reconciliation performs best for Prison and Tourism datasets*)

Dataset	ARIMA	ETS
Prison	Case 1 Lambda 1-4	Case 1 Lambda 0.01-0.09
Tourism	Case 2 Lambda 0.01-5	Case 1 Lambda 1-4
Labour	OLS Best ML Rank – 2 (Case 2 Lambda 1)	Case 1 Lambda 0.01-0.09
Wikipedia	OLS Best ML Rank – 5 (Case 2 Lambda 0.1-0.9)	OLS Best ML Rank – 5 (Case 2 Lambda 0.01-5)

Lambda Ranges – Lambda value for each sample from the overall best ML method
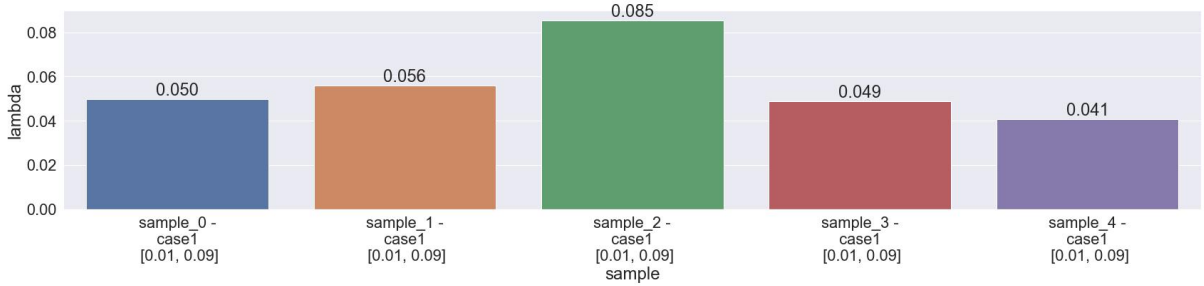
Prison

ARIMA

ETS

Tourism
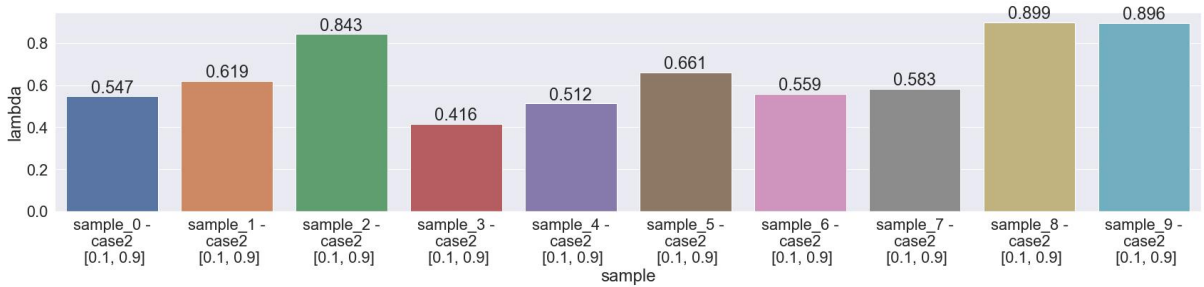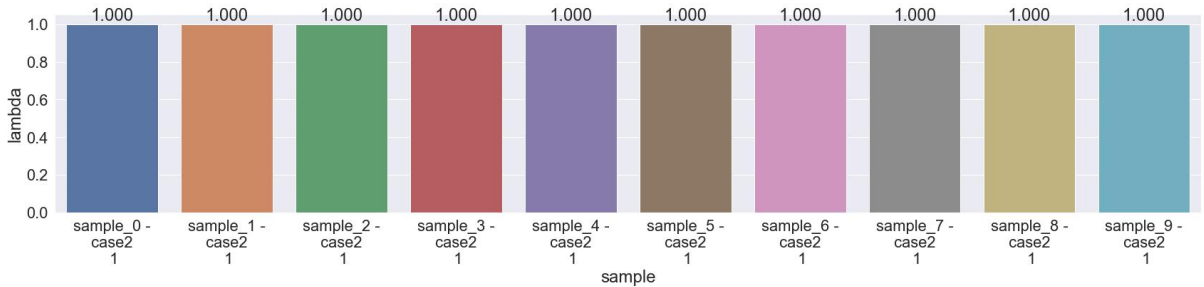
ARIMA

ETS

Labour

ARIMA
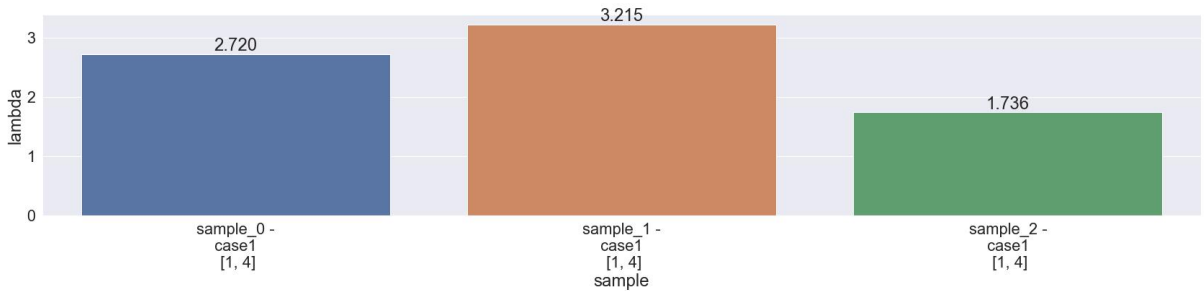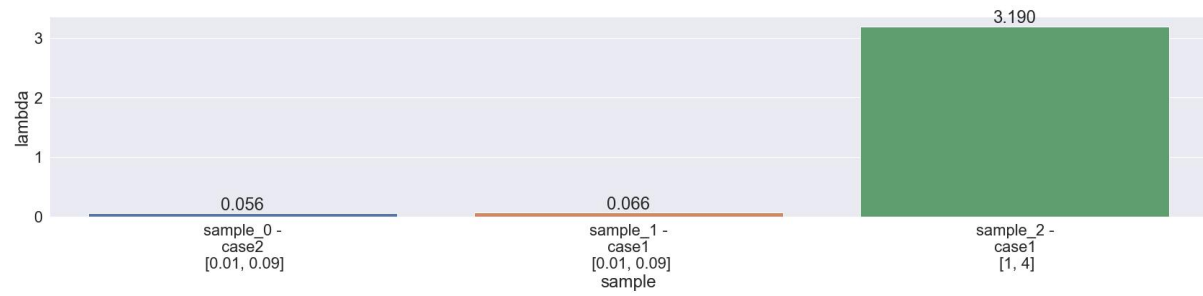

ETS
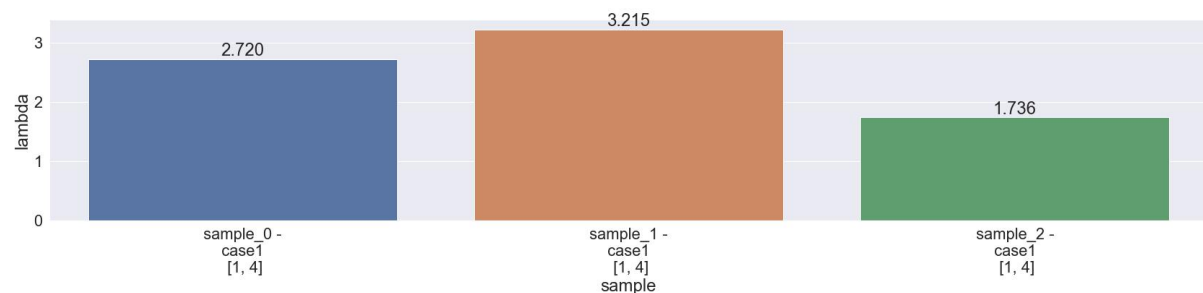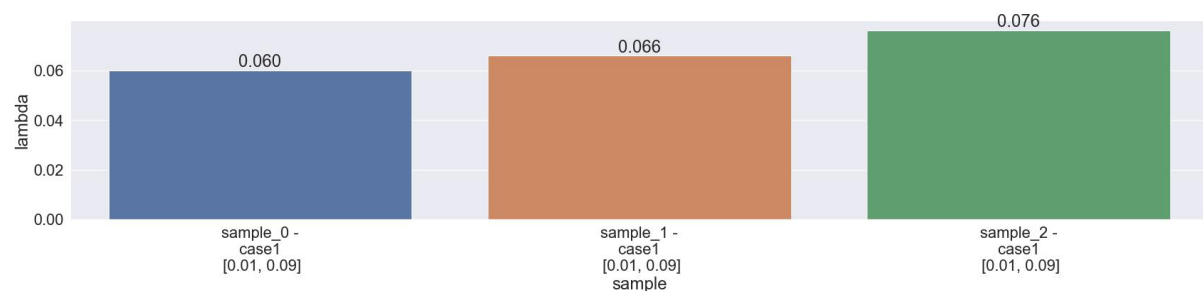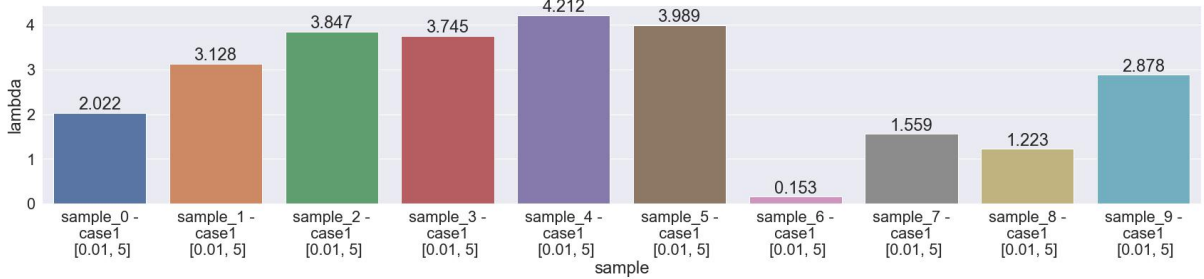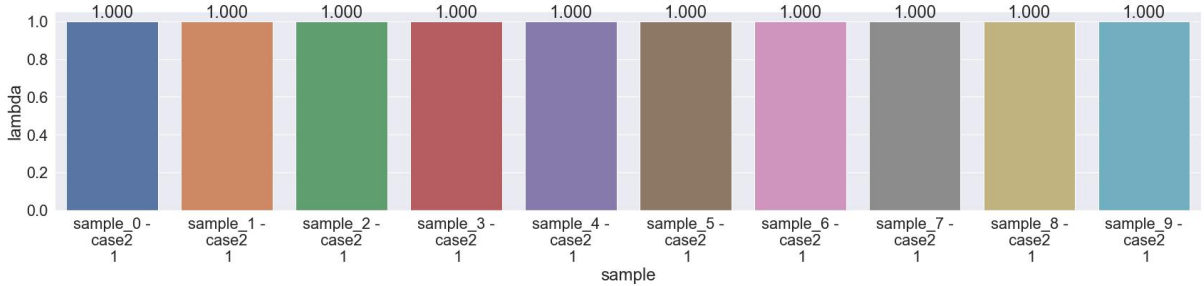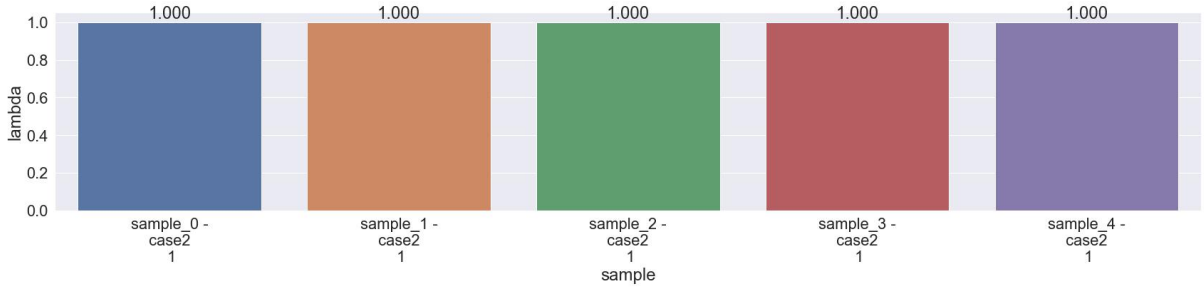
Wikipedia

ARIMA

ETS

Lambda Ranges – Lambda value and the best ML method per sample
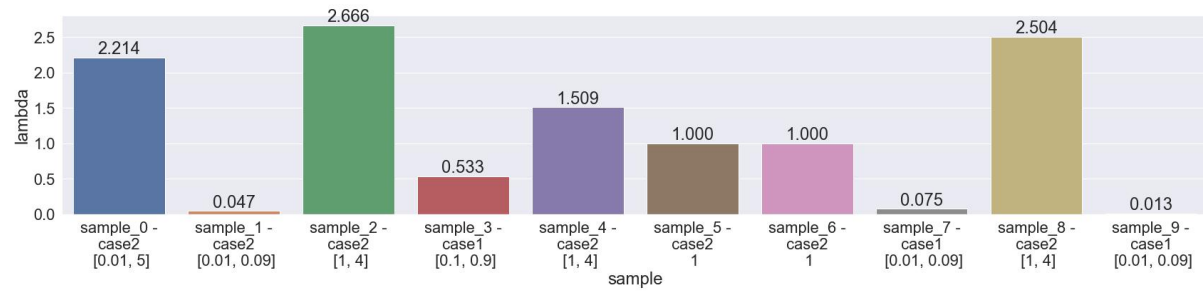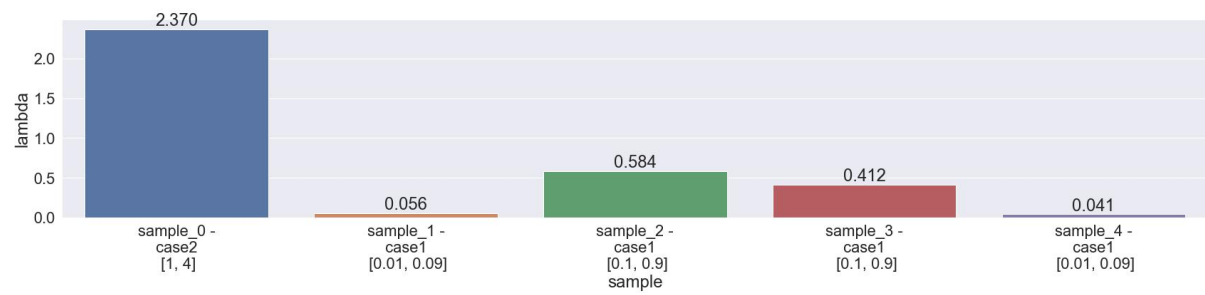
Prison

ARIMA

ETS

Tourism

ARIMA

ETS

Labour

ARIMA

ETS

Wikipedia

ARIMA

ETS