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

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)

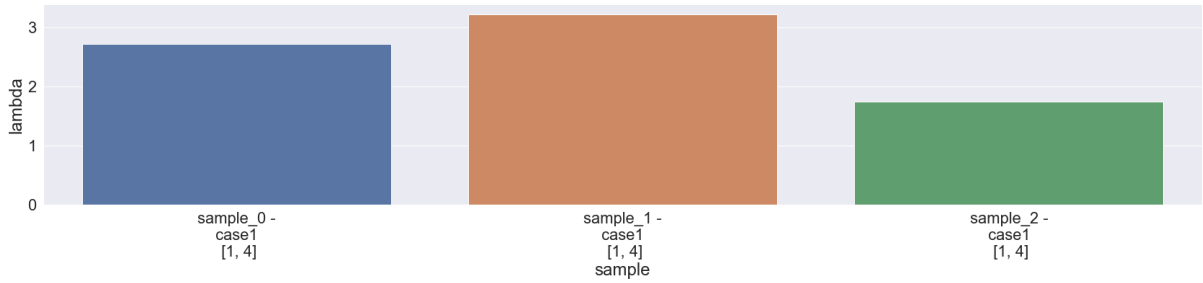
Short Horizon

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)

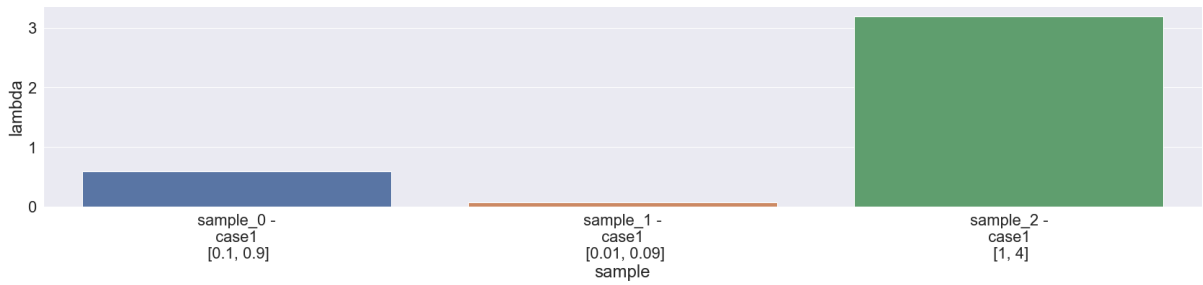
Lambda Ranges

Prison

ARIMA

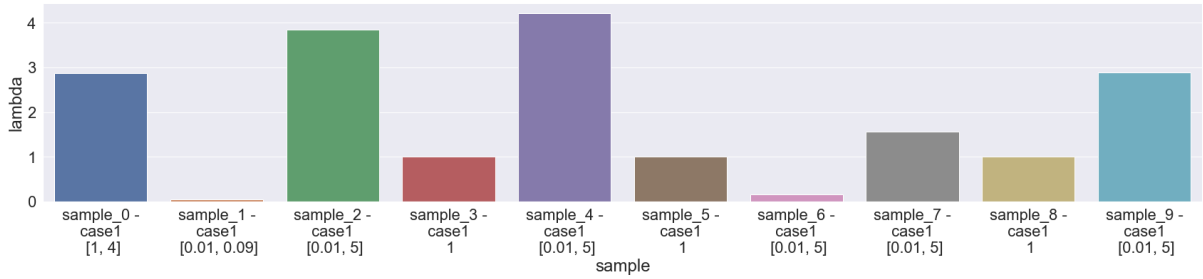


ETS

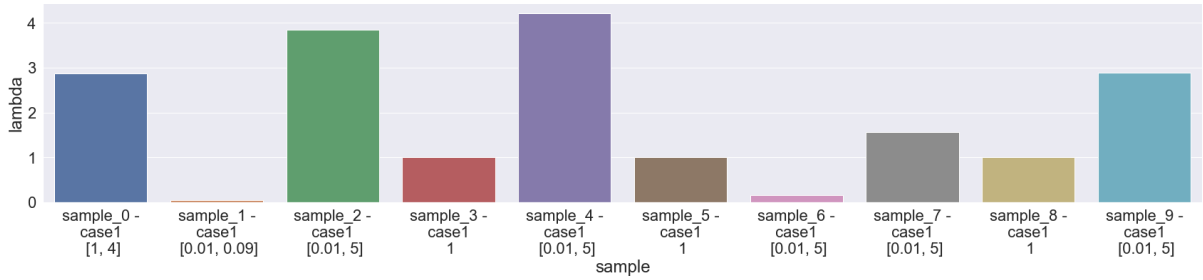


Tourism

ARIMA

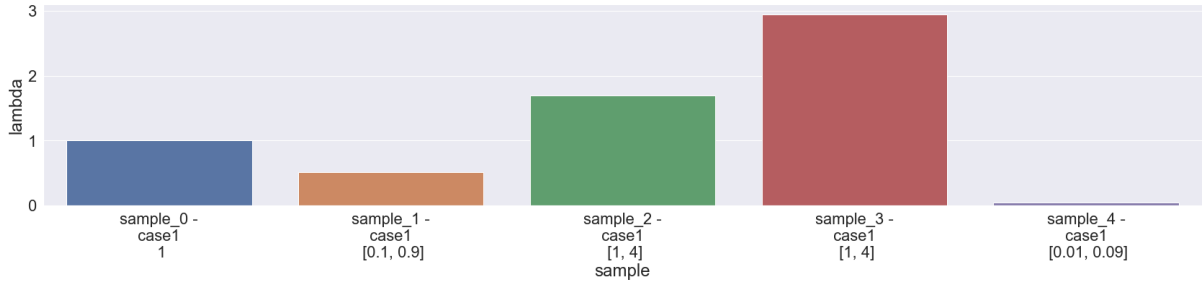


ETS

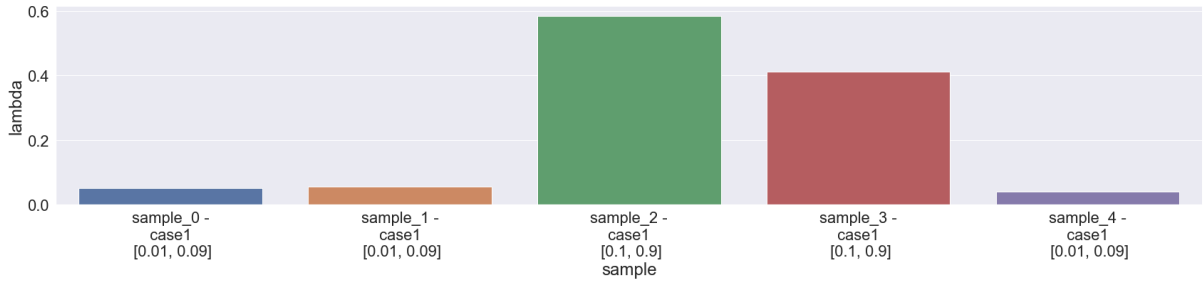


Labour

ARIMA

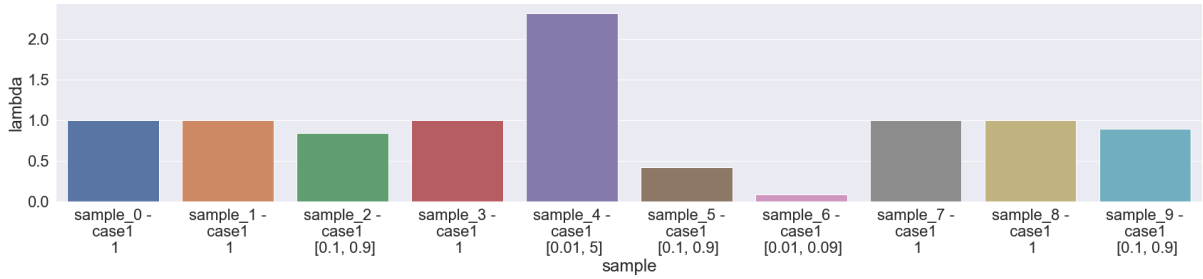


ETS

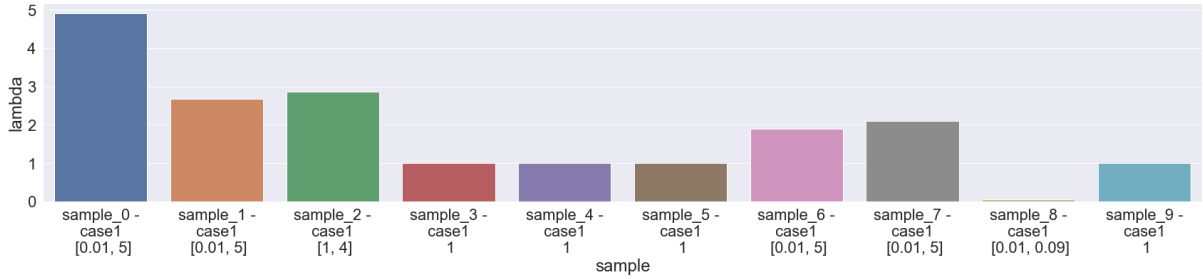


Wikipedia

ARIMA


lambda
2.0
1.5
1.0
0.5
0.0
sample_0 - case1 1
sample_1 - case1 1
sample_2 - case1 [0.1, 0.9]
sample_3 - case1 1
sample_4 - case1 [0.01, 5]
sample_5 - case1 [0.1, 0.9]
sample_6 - case1 [0.01, 0.09]
sample_7 - case1 1
sample_8 - case1 1
sample_9 - case1 [0.1, 0.9]
sample

ETS


lambda
5
4
3
2
1
0
sample_0 - case1 [0.01, 5]
sample_1 - case1 [0.01, 5]
sample_2 - case1 [1, 4]
sample_3 - case1 1
sample_4 - case1 1
sample_5 - case1 1
sample_6 - case1 [0.01, 5]
sample_7 - case1 [0.01, 5]
sample_8 - case1 [0.01, 0.09]
sample_9 - case1 1
sample