Appendix
On Forecast Stability

Appendix A. Full results

Tables A.1, A.2 and A.3 respectively show the MASE, RMSSE, and sMAPE based accuracy and stability results of vertical stability experiments across the four experimental datasets. In addition to MASE, RMSSE, and their corresponding stability measures, we report here also sMAPE and corresponding vertical and horizontal stability measures, which are defined as follows:

$$sMAPE = \frac{200\%}{h} \sum_{i=1}^{h} \frac{|y_{t+i} - \hat{y}_{t+i|t}|}{|y_{t+i}| + |\hat{y}_{t+i|t}|} \tag{A.1}$$

$$sMAPC(V) = \frac{200\%}{(h-1)} \sum_{i=1}^{h-1} \frac{|\hat{y}_{t+i|t} - \hat{y}_{t+i|t-1}|}{|\hat{y}_{t+i|t}| + |\hat{y}_{t+i|t-1}|} \tag{A.2}$$

$$sMAPC(H) = \frac{200\%}{(h-1)} \sum_{i=2}^{h} \frac{|\hat{y}_{t+i|t} - \hat{y}_{t+i-1|t}|}{|\hat{y}_{t+i|t}| + |\hat{y}_{t+i-1|t}|} \tag{A.3}$$

The error measures are defined across one to h-step ahead forecasts resulting from a specific forecasting origin t, where h is the forecast horizon, y_{t+i} is the actual series value at time $t+i$ and $\hat{y}_{t+i|t}$ is the forecast corresponding with time $t+i$ made at time t.

Here, sMAPC(V) measures the change of one to h-step ahead forecasts corresponding with two adjacent forecast origins, t and $t-1$. Thus, it provides a measurement of up to which extent the forecasts generated at origin t are stable compared to the forecasts generated at origin $t-1$ for the same time period. Analogously, sMAPC(H) measures the change between two forecasts from the same origin but for adjacent targets.

Table A.1: MASE, MASC and MASC_I results of vertical stability experiments.

		MASE				MASC				MASC_I			
		M4	M3	Favorita	M5	M4	M3	Favorita	M5	M4	M3	Favorita	M5
N-BEATS	Base	0.6385	0.6431	-	-	0.3073	0.2603	-	-	0.4561	0.3921	-	-
N-BEATS	Stable	0.6485	0.6391	-	-	0.2532	0.1931	-	-	0.4155	0.3314	-	-
N-BEATS	PI_0.2	0.6346	0.6423	-	-	0.2762	0.2113	-	-	0.4358	0.3589	-	-
N-BEATS	PI_0.4	0.6382	0.6450	-	-	0.2239	0.1769	-	-	0.3983	0.3296	-	-
N-BEATS	PI_0.5	0.6425	0.6478	-	-	0.2099	0.1676	-	-	0.3820	0.3166	-	-
N-BEATS	PI_0.6	0.6485	0.6515	-	-	0.2056	0.1639	-	-	0.3676	0.3048	-	-
N-BEATS	PI_0.8	0.6650	0.6615	-	-	0.2201	0.1715	-	-	0.3445	0.2852	-	-
N-BEATS	PI_1	0.6871	0.6748	-	-	0.2545	0.1924	-	-	0.3298	0.2710	-	-
N-BEATS	FI_0.2	0.6343	0.6419	-	-	0.2754	0.2098	-	-	0.4299	0.3538	-	-
N-BEATS	FI_0.4	0.6374	0.6439	-	-	0.2098	0.1632	-	-	0.3691	0.3050	-	-
N-BEATS	FI_0.5	0.6424	0.6466	-	-	0.1785	0.1403	-	-	0.3317	0.2744	-	-
N-BEATS	FI_0.6	0.6505	0.6512	-	-	0.1473	0.1169	-	-	0.2875	0.2381	-	-
N-BEATS	FI_0.8	0.6826	0.6700	-	-	0.0815	0.0659	-	-	0.1713	0.1420	-	-
N-BEATS	FI_1	0.7532	0.7164	-	-	0.0000	0.0000	-	-	0.0000	0.0000	-	-
PR	Base	0.7911	0.7552	0.7737	1.3569	0.2186	0.1901	0.1666	0.4012	0.3721	0.2875	0.1966	0.6465
PR	PI_0.2	0.7983	0.7593	0.7715	1.3493	0.1969	0.1574	0.1313	0.3123	0.3546	0.2597	0.1740	0.6063
PR	PI_0.4	0.8075	0.7650	0.7705	1.3465	0.1695	0.1319	0.1022	0.2512	0.3231	0.2344	0.1540	0.5735
PR	PI_0.5	0.8128	0.7684	0.7704	1.3469	0.1604	0.1236	0.0932	0.2371	0.3084	0.2230	0.1452	0.5604
PR	PI_0.6	0.8186	0.7721	0.7707	1.3485	0.1546	0.1188	0.0881	0.2355	0.2946	0.2123	0.1373	0.5496
PR	PI_0.8	0.8316	0.7807	0.7723	1.3555	0.1520	0.1188	0.0883	0.2653	0.2699	0.1940	0.1250	0.5357
PR	PI_1	0.8465	0.7908	0.7752	1.3674	0.1596	0.1286	0.1010	0.3261	0.2497	0.1804	0.1187	0.5325
PR	FI_0.2	0.7989	0.7598	0.7713	1.3485	0.1948	0.1562	0.1312	0.3122	0.3495	0.2559	0.1717	0.6010
PR	FI_0.4	0.8108	0.7676	0.7699	1.3426	0.1569	0.1233	0.0983	0.2352	0.2990	0.2168	0.1432	0.5455
PR	FI_0.5	0.8189	0.7731	0.7696	1.3404	0.1368	0.1065	0.0824	0.1997	0.2676	0.1931	0.1267	0.5099
PR	FI_0.6	0.8291	0.7800	0.7699	1.3387	0.1153	0.0889	0.0669	0.1652	0.2309	0.1657	0.1081	0.4650
PR	FI_0.8	0.8589	0.7999	0.7723	1.3398	0.0657	0.0497	0.0354	0.0945	0.1358	0.0964	0.0624	0.3217
PR	FI_1	0.9111	0.8332	0.7796	1.3875	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LightGBM	Base	0.8540	0.7664	0.9142	1.3416	0.2815	0.2395	0.1520	0.2728	0.4452	0.3504	0.2274	0.5206
LightGBM	PI_0.2	0.8580	0.7692	0.9180	1.3399	0.2608	0.1941	0.1251	0.2203	0.4255	0.3180	0.2049	0.4936
LightGBM	PI_0.4	0.8664	0.7745	0.9226	1.3408	0.2154	0.1603	0.1035	0.1842	0.3869	0.2894	0.1842	0.4711
LightGBM	PI_0.5	0.8723	0.7782	0.9251	1.3420	0.2016	0.1502	0.0961	0.1752	0.3696	0.2766	0.1747	0.4613
LightGBM	PI_0.6	0.8792	0.7825	0.9277	1.3436	0.1957	0.1459	0.0917	0.1759	0.3539	0.2649	0.1658	0.4525
LightGBM	PI_0.8	0.8960	0.7930	0.9334	1.3485	0.2022	0.1514	0.0901	0.1931	0.3272	0.2452	0.1499	0.4383
LightGBM	PI_1	0.9165	0.8059	0.9397	1.3561	0.2261	0.1698	0.0965	0.2267	0.3084	0.2313	0.1372	0.4304
LightGBM	FI_0.2	0.8585	0.7696	0.9184	1.3395	0.2594	0.1931	0.1243	0.2186	0.4196	0.3136	0.2022	0.4890
LightGBM	FI_0.4	0.8693	0.7767	0.9249	1.3392	0.2023	0.1503	0.0977	0.1705	0.3585	0.2679	0.1713	0.4479
LightGBM	FI_0.5	0.8777	0.7823	0.9291	1.3396	0.1738	0.1291	0.0842	0.1473	0.3210	0.2399	0.1527	0.4202
LightGBM	FI_0.6	0.8890	0.7897	0.9342	1.3406	0.1445	0.1074	0.0702	0.1240	0.2773	0.2071	0.1312	0.3843
LightGBM	FI_0.8	0.9244	0.8131	0.9482	1.3471	0.0804	0.0599	0.0391	0.0735	0.1638	0.1222	0.0766	0.2665
LightGBM	FI_1	0.9904	0.8574	0.9698	1.3903	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ETS	Base	0.6558	0.6169	0.7744	1.2669	0.2631	0.2091	0.0920	0.1731	0.4529	0.3371	0.1410	0.3349
ETS	PI_0.2	0.6574	0.6175	0.7742	1.2668	0.2424	0.1711	0.0752	0.1424	0.4395	0.3106	0.1291	0.3172
ETS	PI_0.4	0.6644	0.6214	0.7745	1.2678	0.2072	0.1449	0.0634	0.1223	0.4048	0.2866	0.1184	0.3020
ETS	PI_0.5	0.6698	0.6245	0.7749	1.2688	0.1974	0.1382	0.0602	0.1176	0.3889	0.2756	0.1136	0.2955
ETS	PI_0.6	0.6764	0.6283	0.7754	1.2701	0.1933	0.1365	0.0587	0.1167	0.3742	0.2654	0.1091	0.2898
ETS	PI_0.8	0.6927	0.6382	0.7769	1.2736	0.1987	0.1428	0.0604	0.1259	0.3486	0.2476	0.1016	0.2809
ETS	PI_1	0.7128	0.6505	0.7790	1.2783	0.2180	0.1582	0.0668	0.1462	0.3290	0.2337	0.0960	0.2757
ETS	FI_0.2	0.6568	0.6173	0.7740	1.2666	0.2397	0.1697	0.0746	0.1410	0.4333	0.3061	0.1273	0.3140
ETS	FI_0.4	0.6634	0.6212	0.7740	1.2671	0.1895	0.1334	0.0582	0.1115	0.3748	0.2655	0.1096	0.2858
ETS	FI_0.5	0.6697	0.6250	0.7741	1.2677	0.1643	0.1155	0.0501	0.0969	0.3377	0.2396	0.0986	0.2671
ETS	FI_0.6	0.6792	0.6307	0.7744	1.2689	0.1381	0.0970	0.0419	0.0818	0.2934	0.2085	0.0855	0.2431
ETS	FI_0.8	0.7145	0.6520	0.7760	1.2746	0.0791	0.0556	0.0237	0.0483	0.1753	0.1250	0.0509	0.1670
ETS	FI_1	0.7901	0.6997	0.7822	1.3011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ARIMA	Base	0.6339	0.6180	0.7847	1.2881	0.2752	0.2058	0.0997	0.1528	0.4346	0.3263	0.1261	0.3073
ARIMA	PI_0.2	0.6349	0.6183	0.7835	1.2883	0.2255	0.1681	0.0793	0.1242	0.3982	0.2992	0.1124	0.2907
ARIMA	PI_0.4	0.6414	0.6221	0.7832	1.2894	0.1908	0.1422	0.0638	0.1050	0.3653	0.2748	0.1003	0.2762
ARIMA	PI_0.5	0.6465	0.6251	0.7833	1.2903	0.1809	0.1353	0.0587	0.1000	0.3502	0.2636	0.0949	0.2699
ARIMA	PI_0.6	0.6527	0.6289	0.7836	1.2914	0.1766	0.1325	0.0560	0.0984	0.3363	0.2532	0.0901	0.2644
ARIMA	PI_0.8	0.6683	0.6387	0.7848	1.2945	0.1814	0.1368	0.0563	0.1054	0.3124	0.2352	0.0825	0.2556
ARIMA	PI_1	0.6877	0.6513	0.7868	1.2986	0.2004	0.1512	0.0637	0.1235	0.2945	0.2216	0.0782	0.2503
ARIMA	FI_0.2	0.6347	0.6182	0.7834	1.2883	0.2235	0.1667	0.0791	0.1234	0.3926	0.2950	0.1109	0.2880
ARIMA	FI_0.4	0.6416	0.6220	0.7827	1.2894	0.1758	0.1311	0.0601	0.0972	0.3384	0.2547	0.0932	0.2627
ARIMA	FI_0.5	0.6481	0.6259	0.7826	1.2905	0.1520	0.1134	0.0509	0.0845	0.3044	0.2293	0.0828	0.2458
ARIMA	FI_0.6	0.6576	0.6316	0.7827	1.2921	0.1274	0.0952	0.0417	0.0716	0.2640	0.1990	0.0709	0.2243
ARIMA	FI_0.8	0.6916	0.6524	0.7840	1.2985	0.0725	0.0543	0.0224	0.0430	0.1572	0.1187	0.0413	0.1548
ARIMA	FI_1	0.7613	0.6981	0.7886	1.3242	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table A.2: RMSSE, RMSSC and RMSSC_I results of vertical stability experiments.

		RMSSE				RMSSC				RMSSC_I			
		M4	M3	Favorita	M5	M4	M3	Favorita	M5	M4	M3	Favorita	M5
N-BEATS	Base	0.5607	0.5929	-	-	0.2341	0.2112	-	-	0.3781	0.3456	-	-
N-BEATS	Stable	0.5664	0.5900	-	-	0.1814	0.1573	-	-	0.3469	0.2948	-	-
N-BEATS	PI_0.2	0.5574	0.5921	-	-	0.2214	0.1723	-	-	0.3742	0.3202	-	-
N-BEATS	PI_0.4	0.5600	0.5945	-	-	0.1813	0.1464	-	-	0.3467	0.2984	-	-
N-BEATS	PI_0.5	0.5634	0.5968	-	-	0.1711	0.1399	-	-	0.3354	0.2892	-	-
N-BEATS	PI_0.6	0.5682	0.5999	-	-	0.1688	0.1381	-	-	0.3261	0.2813	-	-
N-BEATS	PI_0.8	0.5813	0.6083	-	-	0.1863	0.1481	-	-	0.3139	0.2698	-	-
N-BEATS	PI_1	0.5989	0.6193	-	-	0.2266	0.1739	-	-	0.3115	0.2652	-	-
N-BEATS	FI_0.2	0.5571	0.5918	-	-	0.2206	0.1708	-	-	0.3693	0.3157	-	-
N-BEATS	FI_0.4	0.5593	0.5936	-	-	0.1688	0.1341	-	-	0.3218	0.2765	-	-
N-BEATS	FI_0.5	0.5631	0.5960	-	-	0.1442	0.1161	-	-	0.2918	0.2512	-	-
N-BEATS	FI_0.6	0.5696	0.5999	-	-	0.1197	0.0976	-	-	0.2556	0.2203	-	-
N-BEATS	FI_0.8	0.5959	0.6165	-	-	0.0674	0.0563	-	-	0.1561	0.1347	-	-
N-BEATS	FI_1	0.6577	0.6584	-	-	0.0000	0.0000	-	-	0.0000	0.0000	-	-
PR	Base	0.6896	0.6886	0.5863	1.0086	0.1683	0.1527	0.1062	0.2514	0.3297	0.2543	0.1333	0.4365
PR	PI_0.2	0.6943	0.6914	0.5848	1.0035	0.1496	0.1273	0.0839	0.1975	0.3004	0.2328	0.1192	0.4116
PR	PI_0.4	0.7009	0.6955	0.5843	1.0015	0.1311	0.1086	0.0661	0.1613	0.2781	0.2136	0.1070	0.3917
PR	PI_0.5	0.7047	0.6980	0.5844	1.0018	0.1253	0.1029	0.0606	0.1529	0.2680	0.2050	0.1017	0.3839
PR	PI_0.6	0.7090	0.7009	0.5847	1.0028	0.1220	0.1000	0.0576	0.1518	0.2586	0.1973	0.0971	0.3778
PR	PI_0.8	0.7189	0.7076	0.5861	1.0074	0.1231	0.1027	0.0591	0.1702	0.2428	0.1845	0.0905	0.3708
PR	PI_1	0.7303	0.7157	0.5885	1.0151	0.1338	0.1148	0.0698	0.2105	0.2315	0.1764	0.0884	0.3717
PR	FI_0.2	0.6947	0.6917	0.5848	1.0029	0.1478	0.1262	0.0838	0.1970	0.2961	0.2295	0.1177	0.4082
PR	FI_0.4	0.7028	0.6972	0.5841	0.9988	0.1206	0.1008	0.0631	0.1501	0.2576	0.1977	0.0995	0.3734
PR	FI_0.5	0.7086	0.7012	0.5841	0.9972	0.1061	0.0878	0.0532	0.1282	0.2329	0.1778	0.0888	0.3508
PR	FI_0.6	0.7159	0.7063	0.5845	0.9960	0.0904	0.0740	0.0435	0.1068	0.2031	0.1542	0.0765	0.3221
PR	FI_0.8	0.7386	0.7218	0.5871	0.9962	0.0530	0.0424	0.0234	0.0620	0.1224	0.0919	0.0452	0.2270
PR	FI_1	0.7814	0.7497	0.5940	1.0267	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LightGBM	Base	0.7392	0.7003	0.6312	0.9871	0.2243	0.2028	0.0952	0.1796	0.3847	0.3155	0.1461	0.3550
LightGBM	PI_0.2	0.7412	0.7018	0.6324	0.9853	0.2091	0.1641	0.0778	0.1444	0.3694	0.2895	0.1326	0.3372
LightGBM	PI_0.4	0.7471	0.7058	0.6340	0.9852	0.1745	0.1366	0.0644	0.1212	0.3404	0.2671	0.1205	0.3227
LightGBM	PI_0.5	0.7515	0.7087	0.6351	0.9858	0.1645	0.1289	0.0600	0.1158	0.3281	0.2575	0.1151	0.3168
LightGBM	PI_0.6	0.7567	0.7121	0.6362	0.9869	0.1606	0.1262	0.0576	0.1157	0.3173	0.2492	0.1102	0.3118
LightGBM	PI_0.8	0.7697	0.7207	0.6389	0.9903	0.1706	0.1350	0.0584	0.1281	0.3013	0.2367	0.1022	0.3050
LightGBM	PI_1	0.7859	0.7314	0.6420	0.9955	0.2001	0.1589	0.0660	0.1536	0.2940	0.2310	0.0971	0.3031
LightGBM	FI_0.2	0.7415	0.7020	0.6325	0.9850	0.2078	0.1632	0.0774	0.1434	0.3644	0.2856	0.1309	0.3342
LightGBM	FI_0.4	0.7486	0.7070	0.6349	0.9838	0.1628	0.1275	0.0607	0.1117	0.3159	0.2477	0.1122	0.3075
LightGBM	FI_0.5	0.7546	0.7112	0.6366	0.9835	0.1405	0.1099	0.0523	0.0966	0.2855	0.2238	0.1008	0.2895
LightGBM	FI_0.6	0.7629	0.7169	0.6388	0.9836	0.1177	0.0920	0.0437	0.0815	0.2491	0.1953	0.0873	0.2662
LightGBM	FI_0.8	0.7905	0.7359	0.6453	0.9864	0.0669	0.0523	0.0246	0.0487	0.1507	0.1181	0.0522	0.1879
LightGBM	FI_1	0.8467	0.7745	0.6570	1.0139	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ETS	Base	0.5713	0.5690	0.5670	0.9332	0.2025	0.1677	0.0526	0.1017	0.3931	0.2994	0.0900	0.2123
ETS	PI_0.2	0.5724	0.5695	0.5670	0.9331	0.1845	0.1384	0.0435	0.0839	0.3713	0.2788	0.0835	0.2022
ETS	PI_0.4	0.5778	0.5728	0.5673	0.9337	0.1607	0.1195	0.0374	0.0727	0.3471	0.2609	0.0778	0.1936
ETS	PI_0.5	0.5820	0.5754	0.5676	0.9343	0.1544	0.1149	0.0359	0.0701	0.3366	0.2531	0.0754	0.1901
ETS	PI_0.6	0.5871	0.5786	0.5679	0.9351	0.1523	0.1140	0.0353	0.0698	0.3272	0.2462	0.0732	0.1870
ETS	PI_0.8	0.5996	0.5867	0.5690	0.9372	0.1603	0.1220	0.0372	0.0757	0.3126	0.2356	0.0699	0.1826
ETS	PI_1	0.6150	0.5969	0.5704	0.9400	0.1834	0.1411	0.0428	0.0889	0.3050	0.2301	0.0682	0.1807
ETS	FI_0.2	0.5721	0.5694	0.5669	0.9330	0.1822	0.1370	0.0430	0.0830	0.3662	0.2750	0.0824	0.2002
ETS	FI_0.4	0.5775	0.5729	0.5671	0.9332	0.1460	0.1092	0.0341	0.0661	0.3220	0.2421	0.0722	0.1838
ETS	FI_0.5	0.5827	0.5762	0.5673	0.9335	0.1277	0.0954	0.0297	0.0577	0.2931	0.2205	0.0655	0.1727
ETS	FI_0.6	0.5903	0.5812	0.5677	0.9341	0.1085	0.0810	0.0251	0.0490	0.2575	0.1939	0.0575	0.1583
ETS	FI_0.8	0.6190	0.6000	0.5694	0.9370	0.0638	0.0477	0.0146	0.0295	0.1579	0.1192	0.0351	0.1110
ETS	FI_1	0.6837	0.6434	0.5741	0.9524	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ARIMA	Base	0.5547	0.5683	0.5732	0.9510	0.2104	0.1685	0.0644	0.0958	0.3656	0.2921	0.0855	0.2025
ARIMA	PI_0.2	0.5554	0.5686	0.5724	0.9509	0.1739	0.1387	0.0514	0.0782	0.3389	0.2708	0.0766	0.1924
ARIMA	PI_0.4	0.5604	0.5717	0.5721	0.9514	0.1498	0.1193	0.0416	0.0666	0.3154	0.2520	0.0689	0.1837
ARIMA	PI_0.5	0.5643	0.5743	0.5722	0.9519	0.1432	0.1142	0.0384	0.0635	0.3051	0.2438	0.0656	0.1800
ARIMA	PI_0.6	0.5691	0.5776	0.5724	0.9526	0.1407	0.1125	0.0367	0.0626	0.2960	0.2365	0.0628	0.1769
ARIMA	PI_0.8	0.5810	0.5858	0.5733	0.9544	0.1477	0.1186	0.0376	0.0670	0.2818	0.2251	0.0588	0.1722
ARIMA	PI_1	0.5958	0.5962	0.5748	0.9569	0.1696	0.1364	0.0440	0.0790	0.2745	0.2191	0.0576	0.1699
ARIMA	FI_0.2	0.5553	0.5685	0.5723	0.9509	0.1720	0.1374	0.0512	0.0776	0.3342	0.2671	0.0756	0.1907
ARIMA	FI_0.4	0.5606	0.5718	0.5718	0.9513	0.1371	0.1093	0.0392	0.0614	0.2927	0.2340	0.0641	0.1751
ARIMA	FI_0.5	0.5657	0.5752	0.5718	0.9518	0.1195	0.0953	0.0333	0.0535	0.2658	0.2125	0.0573	0.1647
ARIMA	FI_0.6	0.5732	0.5802	0.5719	0.9525	0.1012	0.0807	0.0274	0.0455	0.2330	0.1863	0.0494	0.1512
ARIMA	FI_0.8	0.6006	0.5988	0.5730	0.9556	0.0590	0.0471	0.0149	0.0276	0.1423	0.1138	0.0293	0.1064
ARIMA	FI_1	0.6601	0.6409	0.5767	0.9699	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table A.3: sMAPE, sMAPC and sMAPC_I results of vertical stability experiments.

		sMAPE				sMAPC				sMAPC_I			
		M4	M3	Favorita	M5	M4	M3	Favorita	M5	M4	M3	Favorita	M5
N-BEATS	Base	9.296	11.485	-	-	4.717	3.932	-	-	6.468	5.786	-	-
N-BEATS	Stable	9.279	11.390	-	-	3.336	2.820	-	-	5.270	4.705	-	-
N-BEATS	PI_0.2	9.265	11.461	-	-	3.745	3.181	-	-	5.886	5.288	-	-
N-BEATS	PI_0.4	9.324	11.484	-	-	3.050	2.649	-	-	5.386	4.850	-	-
N-BEATS	PI_0.5	9.384	11.511	-	-	2.865	2.508	-	-	5.169	4.657	-	-
N-BEATS	PI_0.6	9.464	11.553	-	-	2.808	2.451	-	-	4.976	4.485	-	-
N-BEATS	PI_0.8	9.677	11.673	-	-	2.998	2.569	-	-	4.665	4.202	-	-
N-BEATS	PI_1	9.956	11.831	-	-	3.450	2.889	-	-	4.462	4.000	-	-
N-BEATS	FI_0.2	9.261	11.454	-	-	3.732	3.158	-	-	5.806	5.212	-	-
N-BEATS	FI_0.4	9.318	11.458	-	-	2.851	2.444	-	-	4.991	4.483	-	-
N-BEATS	FI_0.5	9.390	11.478	-	-	2.429	2.095	-	-	4.489	4.029	-	-
N-BEATS	FI_0.6	9.502	11.518	-	-	2.008	1.743	-	-	3.897	3.492	-	-
N-BEATS	FI_0.8	9.919	11.703	-	-	1.119	0.977	-	-	2.339	2.082	-	-
N-BEATS	FI_1	10.806	12.219	-	-	0.000	0.000	-	-	0.000	0.000	-	-
PR	Base	10.632	12.622	103.351	54.964	3.245	3.518	29.190	17.559	5.282	4.896	36.772	26.876
PR	PI_0.2	10.713	12.638	103.255	54.579	2.743	2.880	24.303	13.857	4.817	4.407	33.580	25.222
PR	PI_0.4	10.822	12.680	103.173	54.392	2.350	2.385	20.319	11.260	4.390	3.971	30.665	23.894
PR	PI_0.5	10.886	12.712	103.196	54.374	2.221	2.222	19.011	10.650	4.192	3.777	29.261	23.366
PR	PI_0.6	10.956	12.751	103.269	54.406	2.142	2.132	18.160	10.565	4.007	3.604	27.930	22.935
PR	PI_0.8	11.116	12.851	103.566	54.629	2.118	2.154	17.694	11.810	3.679	3.317	25.568	22.392
PR	PI_1	11.302	12.981	104.084	55.087	2.244	2.388	18.739	14.375	3.418	3.128	23.677	22.273
PR	FI_0.2	10.720	12.638	103.627	54.532	2.715	2.858	24.670	13.856	4.748	4.341	33.216	24.994
PR	FI_0.4	10.860	12.685	103.530	54.162	2.177	2.217	19.386	10.504	4.064	3.661	28.954	22.720
PR	FI_0.5	10.957	12.726	103.563	53.987	1.893	1.894	16.809	8.925	3.640	3.253	26.342	21.269
PR	FI_0.6	11.080	12.783	103.673	53.812	1.594	1.565	13.911	7.361	3.144	2.786	23.174	19.446
PR	FI_0.8	11.448	12.972	104.248	53.556	0.909	0.856	8.077	4.213	1.860	1.618	14.923	13.662
PR	FI_1	12.103	13.333	105.775	54.936	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LightGBM	Base	11.125	12.653	101.341	52.207	3.566	3.478	13.216	9.992	5.450	4.887	18.787	17.961
LightGBM	PI_0.2	11.211	12.680	101.229	52.100	2.950	2.812	10.796	8.108	4.939	4.412	16.703	16.996
LightGBM	PI_0.4	11.332	12.738	101.171	52.081	2.466	2.304	8.846	6.792	4.479	3.996	14.821	16.204
LightGBM	PI_0.5	11.405	12.779	101.155	52.092	2.307	2.146	8.146	6.445	4.270	3.813	13.963	15.862
LightGBM	PI_0.6	11.487	12.827	101.149	52.116	2.223	2.072	7.686	6.466	4.077	3.648	13.163	15.554
LightGBM	PI_0.8	11.673	12.944	101.164	52.209	2.237	2.146	7.359	7.063	3.744	3.375	11.764	15.057
LightGBM	PI_1	11.889	13.089	101.222	52.398	2.440	2.417	7.697	8.259	3.496	3.190	10.659	14.796
LightGBM	FI_0.2	11.221	12.683	101.214	52.079	2.929	2.798	10.701	8.029	4.868	4.349	16.457	16.826
LightGBM	FI_0.4	11.386	12.757	101.120	51.988	2.310	2.165	8.257	6.264	4.144	3.693	13.698	15.369
LightGBM	FI_0.5	11.503	12.815	101.086	51.946	1.993	1.852	7.025	5.398	3.701	3.297	12.087	14.393
LightGBM	FI_0.6	11.652	12.892	101.067	51.907	1.663	1.533	5.768	4.523	3.187	2.838	10.274	13.138
LightGBM	FI_0.8	12.087	13.136	101.107	51.888	0.929	0.845	3.095	2.636	1.868	1.665	5.861	9.062
LightGBM	FI_1	12.827	13.610	101.323	52.690	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ETS	Base	9.984	11.344	104.820	50.866	3.916	3.210	14.192	6.450	6.995	5.011	20.956	11.689
ETS	PI_0.2	10.007	11.332	104.752	50.823	3.652	2.623	12.224	5.375	6.632	4.615	19.505	11.081
ETS	PI_0.4	10.114	11.369	104.742	50.821	3.153	2.213	10.764	4.682	6.130	4.265	18.117	10.560
ETS	PI_0.5	10.195	11.404	104.762	50.834	3.015	2.101	10.332	4.520	5.900	4.106	17.454	10.337
ETS	PI_0.6	10.291	11.449	104.799	50.858	2.960	2.077	10.072	4.488	5.686	3.958	16.817	10.138
ETS	PI_0.8	10.530	11.572	104.928	50.937	3.038	2.186	10.001	4.778	5.306	3.702	15.616	9.825
ETS	PI_1	10.823	11.735	105.120	51.059	3.292	2.432	10.328	5.460	4.996	3.500	14.373	9.646
ETS	FI_0.2	9.995	11.328	104.732	50.811	3.601	2.600	12.106	5.313	6.538	4.552	19.279	10.968
ETS	FI_0.4	10.086	11.356	104.653	50.768	2.862	2.042	9.982	4.248	5.682	3.958	17.022	10.001
ETS	FI_0.5	10.175	11.392	104.621	50.751	2.488	1.764	8.833	3.707	5.137	3.581	15.560	9.354
ETS	FI_0.6	10.312	11.451	104.600	50.737	2.101	1.480	7.612	3.131	4.485	3.128	13.820	8.524
ETS	FI_0.8	10.831	11.695	104.630	50.750	1.229	0.854	4.620	1.848	2.733	1.909	8.957	5.892
ETS	FI_1	11.949	12.303	105.123	51.212	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ARIMA	Base	9.771	11.748	103.635	51.050	4.148	3.169	12.386	5.457	6.571	4.996	15.665	10.441
ARIMA	PI_0.2	9.781	11.745	103.460	51.018	3.413	2.603	10.135	4.489	6.035	4.579	14.095	9.873
ARIMA	PI_0.4	9.876	11.790	103.366	51.017	2.908	2.211	8.294	3.832	5.550	4.202	12.704	9.380
ARIMA	PI_0.5	9.952	11.829	103.352	51.029	2.766	2.097	7.667	3.657	5.329	4.030	12.072	9.166
ARIMA	PI_0.6	10.044	11.878	103.362	51.048	2.704	2.049	7.354	3.606	5.124	3.869	11.485	8.977
ARIMA	PI_0.8	10.275	12.006	103.441	51.111	2.777	2.098	7.347	3.837	4.765	3.587	10.495	8.681
ARIMA	PI_1	10.560	12.176	103.624	51.206	3.050	2.296	7.906	4.428	4.484	3.369	9.690	8.503
ARIMA	FI_0.2	9.777	11.742	103.443	51.012	3.379	2.579	10.055	4.455	5.951	4.516	13.923	9.780
ARIMA	FI_0.4	9.874	11.783	103.298	50.990	2.671	2.039	7.805	3.535	5.151	3.901	11.887	8.915
ARIMA	FI_0.5	9.967	11.828	103.248	50.986	2.317	1.769	6.715	3.084	4.647	3.516	10.689	8.343
ARIMA	FI_0.6	10.105	11.894	103.214	50.987	1.952	1.488	5.590	2.623	4.048	3.060	9.323	7.615
ARIMA	FI_0.8	10.598	12.151	103.245	51.038	1.130	0.859	3.203	1.593	2.452	1.846	5.865	5.286
ARIMA	FI_1	11.618	12.760	103.636	51.487	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Tables A.4, A.5 and A.6 respectively show the MASE, RMSSE, and sMAPE based accuracy and stability results of horizontal stability experiments across the four experimental datasets. The accuracy measures are calculated based on final forecasts and stability measures are calculated based on remainders.

Appendix B. Vertical stability results per horizon

In Figures B.1 to B.9 we show results for some of the models and datasets for sMAPE and sMAPC(V) for vertical stability, separated per horizon. We can see that the forecast for the largest horizon always is a new forecast that is not stabilised, as such, it is the same across all stabilisation methods. Consequently, for the second-largest horizon, as we stabilise against the largest horizon from the previous origin, partial interpolation and full interpolation yields the same result.

Furthermore, the plots show that as is to be expected, accuracy drops in all cases as horizons become larger. For stability, the picture is less clear. In many cases, stability increases as the horizon increases, for some cases it is the opposite, and for some cases, there is no monotonous relationship.

We hypothesise that this depends on characteristics of the datasets and the methods. For example, in our experiments we stabilise forecasts from the same methodology across different origins. Thus, the forecasts will not be independent. If a method is systematically biased this will affect accuracy negatively but not stability. Only variance in the forecasts will be relevant for stability. Furthermore, as horizons become larger, autocorrelations become less important relative to seasonalities and trends. So we expect that there will be datasets where forecasts for longer horizons are more stable than for shorter ones. Also, the relative difference is smaller in larger horizons. For example, the forecast horizon doubles from horizon 1 to horizon 2. This percentage difference is much smaller for larger horizons, e.g., horizon 5 to horizon 6.

Table A.4: MASE, MASC and MASC_I results of horizontal stability experiments.

		MASE				MASC				MASC_I			
		M4	M3	Favorita	M5	M4	M3	Favorita	M5	M4	M3	Favorita	M5
N-BEATS	Base	0.726	0.675	-	-	0.104	0.089	-	-	0.313	0.235	-	-
N-BEATS	PI_0.2	0.727	0.676	-	-	0.091	0.076	-	-	0.297	0.221	-	-
N-BEATS	PI_0.4	0.729	0.676	-	-	0.084	0.069	-	-	0.280	0.207	-	-
N-BEATS	PI_0.5	0.731	0.676	-	-	0.082	0.067	-	-	0.273	0.201	-	-
N-BEATS	PI_0.6	0.732	0.676	-	-	0.082	0.067	-	-	0.265	0.196	-	-
N-BEATS	PI_0.8	0.737	0.677	-	-	0.084	0.069	-	-	0.250	0.186	-	-
N-BEATS	PI_1	0.741	0.678	-	-	0.090	0.075	-	-	0.235	0.179	-	-
N-BEATS	FI_0.2	0.727	0.676	-	-	0.090	0.075	-	-	0.293	0.218	-	-
N-BEATS	FI_0.4	0.729	0.676	-	-	0.077	0.062	-	-	0.261	0.192	-	-
N-BEATS	FI_0.5	0.731	0.676	-	-	0.070	0.055	-	-	0.238	0.175	-	-
N-BEATS	FI_0.6	0.733	0.676	-	-	0.062	0.047	-	-	0.210	0.153	-	-
N-BEATS	FI_0.8	0.740	0.677	-	-	0.038	0.023	-	-	0.126	0.089	-	-
N-BEATS	FI_1	0.754	0.678	-	-	0.000	0.000	-	-	0.000	0.000	-	-
PR	Base	0.803	0.718	1.012	1.781	0.114	0.125	0.252	0.103	0.323	0.250	0.359	0.369
PR	PI_0.2	0.802	0.718	1.011	1.782	0.101	0.102	0.199	0.087	0.307	0.236	0.339	0.363
PR	PI_0.4	0.801	0.718	1.013	1.783	0.094	0.085	0.161	0.078	0.290	0.222	0.322	0.358
PR	PI_0.5	0.801	0.718	1.014	1.783	0.092	0.082	0.153	0.077	0.283	0.216	0.315	0.356
PR	PI_0.6	0.801	0.718	1.016	1.784	0.092	0.082	0.153	0.079	0.275	0.211	0.310	0.354
PR	PI_0.8	0.800	0.718	1.022	1.785	0.094	0.090	0.172	0.088	0.260	0.201	0.302	0.350
PR	PI_1	0.800	0.719	1.029	1.787	0.100	0.105	0.204	0.102	0.245	0.194	0.298	0.347
PR	FI_0.2	0.802	0.718	1.012	1.782	0.100	0.102	0.197	0.084	0.303	0.233	0.335	0.362
PR	FI_0.4	0.801	0.718	1.015	1.783	0.087	0.081	0.146	0.066	0.271	0.207	0.301	0.352
PR	FI_0.5	0.800	0.719	1.019	1.785	0.080	0.072	0.123	0.057	0.248	0.190	0.278	0.343
PR	FI_0.6	0.800	0.720	1.024	1.787	0.072	0.062	0.100	0.047	0.220	0.168	0.248	0.331
PR	FI_0.8	0.800	0.723	1.044	1.800	0.048	0.038	0.055	0.027	0.136	0.104	0.157	0.276
PR	FI_1	0.802	0.731	1.088	1.881	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LightGBM	Base	0.790	0.709	1.005	1.779	0.119	0.126	0.097	0.092	0.346	0.234	0.164	0.207
LightGBM	PI_0.2	0.789	0.708	1.004	1.778	0.105	0.101	0.080	0.083	0.328	0.219	0.156	0.203
LightGBM	PI_0.4	0.787	0.708	1.004	1.778	0.097	0.085	0.068	0.078	0.311	0.207	0.149	0.200
LightGBM	PI_0.5	0.787	0.708	1.004	1.778	0.095	0.082	0.066	0.077	0.303	0.201	0.146	0.199
LightGBM	PI_0.6	0.786	0.708	1.005	1.778	0.096	0.084	0.066	0.077	0.295	0.196	0.144	0.198
LightGBM	PI_0.8	0.786	0.708	1.005	1.779	0.100	0.094	0.072	0.082	0.279	0.188	0.140	0.196
LightGBM	PI_1	0.785	0.708	1.006	1.779	0.107	0.110	0.083	0.089	0.264	0.182	0.137	0.196
LightGBM	FI_0.2	0.788	0.708	1.005	1.778	0.104	0.100	0.078	0.080	0.324	0.216	0.154	0.202
LightGBM	FI_0.4	0.786	0.707	1.005	1.778	0.090	0.079	0.061	0.065	0.291	0.192	0.139	0.194
LightGBM	FI_0.5	0.785	0.707	1.006	1.778	0.084	0.069	0.052	0.056	0.267	0.176	0.129	0.189
LightGBM	FI_0.6	0.783	0.707	1.007	1.778	0.076	0.059	0.043	0.046	0.236	0.155	0.115	0.182
LightGBM	FI_0.8	0.780	0.708	1.013	1.779	0.050	0.036	0.025	0.024	0.146	0.095	0.073	0.152
LightGBM	FI_1	0.778	0.712	1.026	1.794	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ETS	Base	0.749	0.698	0.984	1.776	0.126	0.013	0.259	0.145	0.198	0.018	0.322	0.155
ETS	PI_0.2	0.750	0.699	0.985	1.775	0.104	0.010	0.207	0.118	0.184	0.016	0.296	0.148
ETS	PI_0.4	0.752	0.699	0.989	1.775	0.089	0.008	0.169	0.101	0.172	0.016	0.276	0.143
ETS	PI_0.5	0.754	0.699	0.992	1.775	0.085	0.007	0.157	0.098	0.167	0.015	0.269	0.142
ETS	PI_0.6	0.755	0.699	0.996	1.776	0.085	0.008	0.153	0.099	0.163	0.015	0.264	0.141
ETS	PI_0.8	0.760	0.700	1.007	1.778	0.090	0.009	0.170	0.111	0.156	0.014	0.258	0.142
ETS	PI_1	0.764	0.701	1.021	1.780	0.101	0.010	0.205	0.135	0.152	0.014	0.258	0.146
ETS	FI_0.2	0.750	0.699	0.984	1.775	0.103	0.010	0.206	0.116	0.181	0.016	0.291	0.146
ETS	FI_0.4	0.752	0.699	0.987	1.775	0.081	0.008	0.156	0.088	0.159	0.014	0.253	0.135
ETS	FI_0.5	0.754	0.699	0.991	1.775	0.070	0.006	0.132	0.074	0.145	0.013	0.229	0.128
ETS	FI_0.6	0.756	0.699	0.995	1.775	0.059	0.005	0.107	0.059	0.127	0.012	0.200	0.120
ETS	FI_0.8	0.763	0.700	1.010	1.775	0.033	0.003	0.056	0.029	0.078	0.007	0.122	0.096
ETS	FI_1	0.777	0.701	1.044	1.776	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ARIMA	Base	0.777	0.712	1.029	1.790	0.308	0.196	0.221	0.163	0.581	0.320	0.477	0.645
ARIMA	PI_0.2	0.775	0.710	1.036	1.792	0.256	0.156	0.184	0.135	0.545	0.297	0.454	0.633
ARIMA	PI_0.4	0.775	0.710	1.044	1.795	0.221	0.128	0.160	0.117	0.514	0.278	0.433	0.623
ARIMA	PI_0.5	0.775	0.710	1.049	1.797	0.213	0.122	0.155	0.115	0.500	0.271	0.424	0.619
ARIMA	PI_0.6	0.776	0.710	1.054	1.799	0.213	0.123	0.155	0.118	0.487	0.264	0.416	0.615
ARIMA	PI_0.8	0.779	0.712	1.065	1.803	0.228	0.138	0.168	0.135	0.466	0.254	0.401	0.609
ARIMA	PI_1	0.783	0.714	1.078	1.808	0.257	0.163	0.189	0.160	0.450	0.248	0.388	0.604
ARIMA	FI_0.2	0.774	0.710	1.038	1.793	0.253	0.156	0.182	0.133	0.538	0.293	0.448	0.631
ARIMA	FI_0.4	0.772	0.708	1.053	1.798	0.203	0.120	0.145	0.104	0.478	0.260	0.406	0.610
ARIMA	FI_0.5	0.771	0.707	1.065	1.804	0.178	0.103	0.128	0.090	0.438	0.238	0.375	0.596
ARIMA	FI_0.6	0.771	0.706	1.081	1.812	0.152	0.087	0.110	0.075	0.387	0.210	0.335	0.574
ARIMA	FI_0.8	0.771	0.706	1.134	1.856	0.091	0.050	0.069	0.049	0.240	0.131	0.212	0.476
ARIMA	FI_1	0.779	0.710	1.238	2.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table A.5: RMSSE, RMSSC and RMSSC_I results of horizontal stability experiments.

		RMSSE				RMSSC				RMSSC_I			
		M4	M3	Favorita	M5	M4	M3	Favorita	M5	M4	M3	Favorita	M5
N-BEATS	Base	0.619	0.612	-	-	0.101	0.106	-	-	0.239	0.190	-	-
N-BEATS	PI_0.2	0.620	0.612	-	-	0.080	0.083	-	-	0.228	0.178	-	-
N-BEATS	PI_0.4	0.622	0.613	-	-	0.065	0.067	-	-	0.218	0.169	-	-
N-BEATS	PI_0.5	0.624	0.613	-	-	0.061	0.064	-	-	0.214	0.165	-	-
N-BEATS	PI_0.6	0.626	0.614	-	-	0.061	0.065	-	-	0.211	0.163	-	-
N-BEATS	PI_0.8	0.630	0.614	-	-	0.070	0.079	-	-	0.205	0.161	-	-
N-BEATS	PI_1	0.636	0.615	-	-	0.087	0.101	-	-	0.202	0.162	-	-
N-BEATS	FI_0.2	0.620	0.612	-	-	0.079	0.082	-	-	0.225	0.176	-	-
N-BEATS	FI_0.4	0.622	0.613	-	-	0.059	0.062	-	-	0.203	0.156	-	-
N-BEATS	FI_0.5	0.624	0.613	-	-	0.049	0.052	-	-	0.187	0.143	-	-
N-BEATS	FI_0.6	0.626	0.613	-	-	0.039	0.042	-	-	0.166	0.125	-	-
N-BEATS	FI_0.8	0.633	0.614	-	-	0.017	0.020	-	-	0.102	0.074	-	-
N-BEATS	FI_1	0.645	0.615	-	-	0.000	0.000	-	-	0.000	0.000	-	-
PR	Base	0.685	0.651	0.723	1.253	0.099	0.112	0.194	0.096	0.249	0.205	0.256	0.237
PR	PI_0.2	0.684	0.650	0.723	1.253	0.086	0.091	0.152	0.080	0.238	0.193	0.237	0.231
PR	PI_0.4	0.684	0.650	0.724	1.253	0.078	0.075	0.122	0.070	0.228	0.184	0.225	0.228
PR	PI_0.5	0.683	0.650	0.725	1.253	0.076	0.072	0.115	0.069	0.224	0.180	0.221	0.227
PR	PI_0.6	0.683	0.650	0.727	1.254	0.077	0.072	0.116	0.070	0.221	0.178	0.220	0.227
PR	PI_0.8	0.683	0.650	0.731	1.255	0.083	0.084	0.136	0.080	0.215	0.176	0.224	0.228
PR	PI_1	0.683	0.650	0.737	1.256	0.094	0.103	0.173	0.095	0.212	0.177	0.236	0.231
PR	FI_0.2	0.684	0.650	0.723	1.253	0.086	0.091	0.151	0.078	0.235	0.191	0.234	0.230
PR	FI_0.4	0.683	0.651	0.725	1.253	0.072	0.072	0.113	0.061	0.213	0.171	0.209	0.222
PR	FI_0.5	0.683	0.651	0.728	1.254	0.065	0.063	0.095	0.053	0.197	0.158	0.192	0.216
PR	FI_0.6	0.683	0.651	0.731	1.255	0.057	0.053	0.077	0.044	0.176	0.140	0.172	0.208
PR	FI_0.8	0.682	0.654	0.743	1.262	0.037	0.032	0.042	0.026	0.112	0.089	0.110	0.176
PR	FI_1	0.685	0.660	0.771	1.311	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LightGBM	Base	0.676	0.643	0.720	1.252	0.106	0.116	0.078	0.077	0.264	0.193	0.115	0.144
LightGBM	PI_0.2	0.675	0.643	0.720	1.251	0.092	0.093	0.062	0.067	0.253	0.181	0.108	0.140
LightGBM	PI_0.4	0.674	0.642	0.720	1.251	0.083	0.077	0.052	0.061	0.243	0.172	0.103	0.137
LightGBM	PI_0.5	0.674	0.642	0.720	1.251	0.081	0.074	0.050	0.060	0.239	0.168	0.102	0.136
LightGBM	PI_0.6	0.674	0.642	0.720	1.251	0.082	0.075	0.050	0.060	0.235	0.166	0.101	0.136
LightGBM	PI_0.8	0.673	0.643	0.721	1.252	0.089	0.089	0.059	0.066	0.230	0.166	0.102	0.138
LightGBM	PI_1	0.673	0.643	0.721	1.252	0.103	0.111	0.073	0.076	0.227	0.169	0.106	0.141
LightGBM	FI_0.2	0.675	0.642	0.720	1.251	0.091	0.092	0.062	0.065	0.249	0.178	0.106	0.138
LightGBM	FI_0.4	0.673	0.642	0.720	1.251	0.076	0.072	0.047	0.051	0.227	0.159	0.096	0.130
LightGBM	FI_0.5	0.672	0.642	0.721	1.251	0.069	0.062	0.040	0.044	0.210	0.146	0.088	0.125
LightGBM	FI_0.6	0.671	0.641	0.722	1.251	0.060	0.052	0.033	0.036	0.188	0.130	0.079	0.119
LightGBM	FI_0.8	0.669	0.642	0.726	1.251	0.039	0.030	0.019	0.019	0.119	0.081	0.051	0.098
LightGBM	FI_1	0.668	0.646	0.734	1.261	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ETS	Base	0.642	0.635	0.700	1.249	0.111	0.012	0.212	0.097	0.161	0.016	0.250	0.107
ETS	PI_0.2	0.643	0.635	0.701	1.249	0.090	0.009	0.166	0.078	0.149	0.014	0.227	0.098
ETS	PI_0.4	0.645	0.636	0.705	1.249	0.075	0.007	0.132	0.065	0.139	0.013	0.211	0.093
ETS	PI_0.5	0.647	0.636	0.708	1.249	0.071	0.007	0.124	0.063	0.136	0.013	0.206	0.092
ETS	PI_0.6	0.649	0.637	0.711	1.249	0.071	0.007	0.123	0.064	0.134	0.013	0.204	0.093
ETS	PI_0.8	0.653	0.637	0.720	1.250	0.080	0.008	0.145	0.075	0.133	0.013	0.208	0.096
ETS	PI_1	0.659	0.638	0.732	1.252	0.097	0.010	0.184	0.094	0.136	0.013	0.221	0.104
ETS	FI_0.2	0.643	0.635	0.701	1.249	0.089	0.009	0.166	0.076	0.146	0.014	0.224	0.097
ETS	FI_0.4	0.645	0.636	0.704	1.248	0.069	0.007	0.124	0.057	0.128	0.012	0.193	0.086
ETS	FI_0.5	0.647	0.636	0.707	1.248	0.059	0.006	0.104	0.048	0.116	0.011	0.174	0.080
ETS	FI_0.6	0.649	0.636	0.710	1.248	0.049	0.005	0.084	0.038	0.102	0.010	0.152	0.073
ETS	FI_0.8	0.656	0.637	0.721	1.249	0.027	0.003	0.044	0.019	0.063	0.006	0.093	0.056
ETS	FI_1	0.668	0.638	0.743	1.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ARIMA	Base	0.664	0.647	0.734	1.258	0.275	0.181	0.178	0.150	0.462	0.268	0.325	0.417
ARIMA	PI_0.2	0.663	0.645	0.738	1.259	0.225	0.144	0.147	0.124	0.432	0.247	0.309	0.408
ARIMA	PI_0.4	0.664	0.644	0.744	1.261	0.190	0.116	0.125	0.108	0.409	0.232	0.297	0.402
ARIMA	PI_0.5	0.665	0.645	0.747	1.262	0.182	0.110	0.120	0.106	0.401	0.227	0.293	0.400
ARIMA	PI_0.6	0.666	0.645	0.750	1.263	0.183	0.111	0.121	0.108	0.395	0.224	0.291	0.399
ARIMA	PI_0.8	0.670	0.647	0.759	1.266	0.207	0.131	0.137	0.124	0.392	0.224	0.291	0.400
ARIMA	PI_1	0.675	0.650	0.768	1.269	0.250	0.165	0.166	0.149	0.398	0.232	0.296	0.405
ARIMA	FI_0.2	0.663	0.645	0.739	1.259	0.223	0.143	0.145	0.123	0.426	0.244	0.305	0.406
ARIMA	FI_0.4	0.662	0.643	0.748	1.262	0.175	0.109	0.114	0.097	0.379	0.216	0.277	0.392
ARIMA	FI_0.5	0.661	0.642	0.756	1.265	0.151	0.093	0.099	0.084	0.348	0.198	0.258	0.382
ARIMA	FI_0.6	0.661	0.642	0.765	1.270	0.127	0.077	0.084	0.071	0.309	0.175	0.232	0.369
ARIMA	FI_0.8	0.662	0.641	0.796	1.295	0.074	0.044	0.049	0.043	0.195	0.110	0.150	0.311
ARIMA	FI_1	0.670	0.645	0.857	1.445	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table A.6: sMAPE, sMAPC and sMAPC_I results of horizontal stability experiments.

		sMAPE				sMAPC				sMAPC_I			
		M4	M3	Favorita	M5	M4	M3	Favorita	M5	M4	M3	Favorita	M5
N-BEATS	Base	12.072	14.335	-	-	108.159	117.581	-	-	156.298	157.155	-	-
N-BEATS	PI_0.2	12.076	14.336	-	-	100.386	108.179	-	-	150.404	153.321	-	-
N-BEATS	PI_0.4	12.088	14.339	-	-	94.433	100.549	-	-	143.624	147.908	-	-
N-BEATS	PI_0.5	12.095	14.340	-	-	92.795	98.710	-	-	139.978	144.557	-	-
N-BEATS	PI_0.6	12.103	14.341	-	-	92.398	98.646	-	-	136.218	140.780	-	-
N-BEATS	PI_0.8	12.123	14.344	-	-	92.428	99.887	-	-	128.432	132.068	-	-
N-BEATS	PI_1	12.145	14.346	-	-	91.560	99.001	-	-	120.178	121.740	-	-
N-BEATS	FI_0.2	12.076	14.336	-	-	100.337	108.747	-	-	149.312	152.661	-	-
N-BEATS	FI_0.4	12.088	14.338	-	-	93.264	100.379	-	-	137.745	144.304	-	-
N-BEATS	FI_0.5	12.097	14.339	-	-	88.640	95.846	-	-	128.731	137.574	-	-
N-BEATS	FI_0.6	12.110	14.340	-	-	80.242	89.790	-	-	115.818	127.704	-	-
N-BEATS	FI_0.8	12.152	14.343	-	-	37.434	56.336	-	-	69.065	87.017	-	-
N-BEATS	FI_1	12.233	14.347	-	-	0.000	0.000	-	-	0.000	0.000	-	-
PR	Base	12.823	14.716	123.639	70.398	112.223	126.150	141.205	127.812	160.959	155.614	162.814	172.046
PR	PI_0.2	12.811	14.712	123.638	70.414	105.292	116.008	134.031	121.223	155.714	152.627	163.914	172.290
PR	PI_0.4	12.803	14.714	123.737	70.443	99.659	105.596	123.615	115.695	149.297	147.943	161.724	171.250
PR	PI_0.5	12.799	14.717	123.821	70.461	97.911	102.311	119.676	114.908	145.637	144.779	158.939	170.165
PR	PI_0.6	12.796	14.722	123.924	70.482	96.877	101.129	117.799	115.123	141.696	140.914	155.165	168.643
PR	PI_0.8	12.791	14.737	124.185	70.531	95.781	102.232	115.845	116.719	133.153	131.967	144.815	164.614
PR	PI_1	12.789	14.759	124.524	70.592	94.120	101.900	111.655	117.791	123.858	121.658	132.355	159.924
PR	FI_0.2	12.810	14.718	123.669	70.417	105.709	117.247	135.071	121.516	154.853	151.827	163.580	172.810
PR	FI_0.4	12.798	14.741	123.903	70.469	100.622	108.428	127.158	115.529	144.648	143.869	160.859	173.815
PR	FI_0.5	12.791	14.763	124.125	70.518	97.735	103.744	123.593	113.266	136.591	137.069	156.906	173.831
PR	FI_0.6	12.787	14.795	124.444	70.599	93.543	97.252	118.409	109.228	124.900	126.784	148.979	172.215
PR	FI_0.8	12.788	14.908	125.578	71.032	39.543	49.569	70.872	55.345	73.186	79.909	101.283	143.614
PR	FI_1	12.839	15.148	127.890	73.509	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LightGBM	Base	12.658	14.569	124.022	70.406	105.129	114.501	116.152	107.264	154.178	155.055	150.049	148.920
LightGBM	PI_0.2	12.634	14.551	124.009	70.394	97.356	105.099	108.565	105.942	148.284	151.221	148.601	149.383
LightGBM	PI_0.4	12.613	14.543	124.017	70.390	91.403	97.469	101.347	104.658	141.504	145.808	144.975	148.655
LightGBM	PI_0.5	12.603	14.543	124.032	70.392	89.765	95.630	98.419	103.933	137.858	142.457	142.107	147.794
LightGBM	PI_0.6	12.594	14.546	124.055	70.396	89.368	95.566	96.401	103.186	134.098	138.680	138.717	146.623
LightGBM	PI_0.8	12.578	14.558	124.116	70.411	89.398	96.807	94.034	101.842	126.312	129.968	130.685	143.541
LightGBM	PI_1	12.564	14.580	124.194	70.435	88.530	95.921	90.811	100.106	118.058	119.640	121.037	139.313
LightGBM	FI_0.2	12.630	14.548	124.016	70.390	97.307	105.667	108.578	106.149	147.192	150.561	148.261	150.178
LightGBM	FI_0.4	12.591	14.534	124.067	70.380	90.234	97.299	99.444	105.687	135.625	142.204	142.656	152.467
LightGBM	FI_0.5	12.567	14.529	124.128	70.381	85.610	92.766	93.028	105.429	126.611	135.474	137.074	154.007
LightGBM	FI_0.6	12.539	14.527	124.223	70.391	77.212	86.710	84.062	104.886	113.698	125.604	128.122	155.273
LightGBM	FI_0.8	12.478	14.555	124.585	70.485	34.404	53.256	50.244	84.171	66.945	84.917	90.047	142.331
LightGBM	FI_1	12.442	14.689	125.388	71.169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ETS	Base	12.095	14.358	122.399	70.365	9.500	0.727	81.620	35.587	13.033	0.976	97.368	35.751
ETS	PI_0.2	12.099	14.359	122.279	70.331	8.918	0.690	77.446	33.836	12.733	0.967	96.244	37.235
ETS	PI_0.4	12.111	14.362	122.432	70.316	8.357	0.591	71.906	32.086	12.335	0.937	93.788	37.727
ETS	PI_0.5	12.118	14.363	122.592	70.314	8.131	0.561	68.795	31.523	12.066	0.919	92.092	37.590
ETS	PI_0.6	12.126	14.364	122.810	70.318	8.043	0.583	67.050	31.380	11.761	0.904	90.145	37.219
ETS	PI_0.8	12.146	14.367	123.341	70.339	7.948	0.595	67.089	32.168	11.052	0.842	85.733	35.867
ETS	PI_1	12.168	14.369	124.040	70.381	7.662	0.574	65.360	33.274	10.117	0.749	78.119	33.420
ETS	FI_0.2	12.099	14.359	122.263	70.326	8.926	0.683	77.940	34.135	12.681	0.954	95.969	37.259
ETS	FI_0.4	12.111	14.361	122.328	70.295	8.280	0.607	73.617	33.069	12.058	0.917	92.697	38.278
ETS	FI_0.5	12.120	14.362	122.444	70.282	7.850	0.557	70.492	32.525	11.549	0.879	89.708	38.682
ETS	FI_0.6	12.133	14.363	122.652	70.271	7.295	0.520	66.764	32.004	10.814	0.831	85.277	39.060
ETS	FI_0.8	12.175	14.366	123.476	70.257	5.038	0.369	48.776	27.871	7.883	0.638	64.328	36.683
ETS	FI_1	12.256	14.370	125.483	70.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ARIMA	Base	12.741	14.729	124.112	70.769	118.195	128.660	129.235	129.085	151.142	152.250	165.513	174.413
ARIMA	PI_0.2	12.672	14.672	124.457	70.871	111.258	125.315	120.771	121.352	146.357	147.546	162.845	174.215
ARIMA	PI_0.4	12.630	14.646	124.845	70.993	104.654	119.112	112.656	115.004	141.286	144.042	158.691	173.267
ARIMA	PI_0.5	12.618	14.643	125.037	71.060	102.276	117.045	109.946	113.752	138.271	141.769	155.688	172.185
ARIMA	PI_0.6	12.612	14.647	125.250	71.131	100.933	116.009	108.362	114.833	134.976	139.241	152.034	170.595
ARIMA	PI_0.8	12.616	14.675	125.729	71.285	99.504	115.189	106.394	118.215	127.851	133.463	143.081	166.463
ARIMA	PI_1	12.643	14.721	126.251	71.450	97.112	113.036	103.625	120.608	119.772	126.663	133.113	161.841
ARIMA	FI_0.2	12.664	14.669	124.560	70.900	109.693	123.646	121.894	122.359	145.347	146.572	162.416	174.364
ARIMA	FI_0.4	12.588	14.623	125.363	71.152	97.906	112.762	114.944	115.388	135.942	139.429	155.416	173.695
ARIMA	FI_0.5	12.548	14.605	125.960	71.367	90.845	106.256	111.004	111.698	128.414	133.566	148.717	172.532
ARIMA	FI_0.6	12.506	14.592	126.752	71.699	81.791	98.183	104.948	107.916	117.690	125.126	137.568	169.705
ARIMA	FI_0.8	12.430	14.592	129.089	73.296	49.708	73.412	48.383	49.302	79.044	95.329	84.225	137.414
ARIMA	FI_1	12.448	14.708	132.640	80.491	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

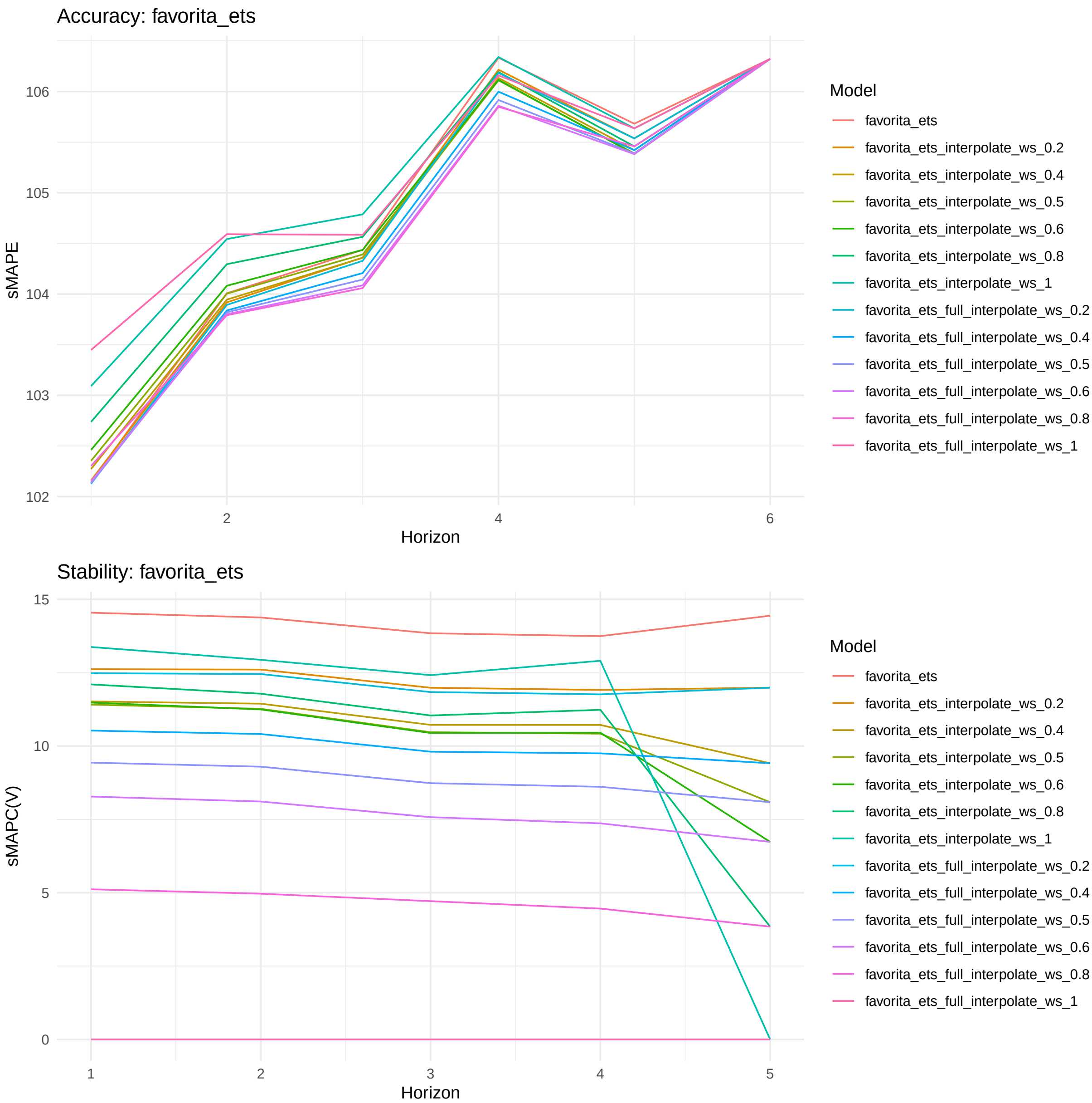


Figure B.1: Accuracy (top) and Vertical Stability (bottom) for ETS for the Favorita dataset. We can see that the forecast for the largest horizon always is a new forecast that is not stabilised, as such, it is the same across all stabilisation methods. Consequently, for the second-largest horizon, as we stabilise against the largest horizon from the previous origin, partial interpolation and full interpolation yields the same result. Furthermore, we can see that accuracy decreases with an increasing horizon, whereas stability stays relatively constant across horizons.

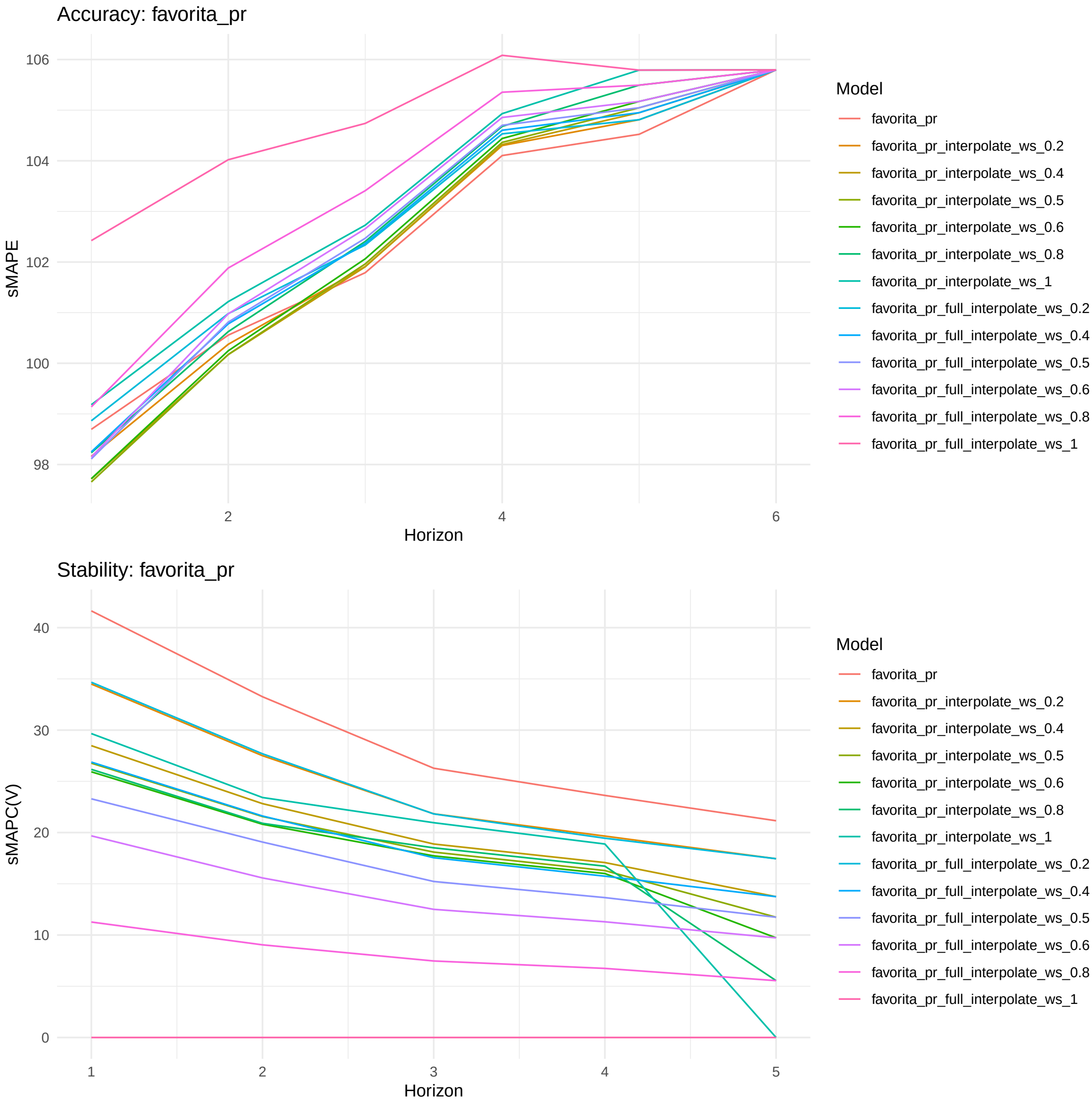


Figure B.2: Accuracy (top) and Vertical Stability (bottom) for PR for the Favorita dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, whereas stability increases (as sMAPC decreases).

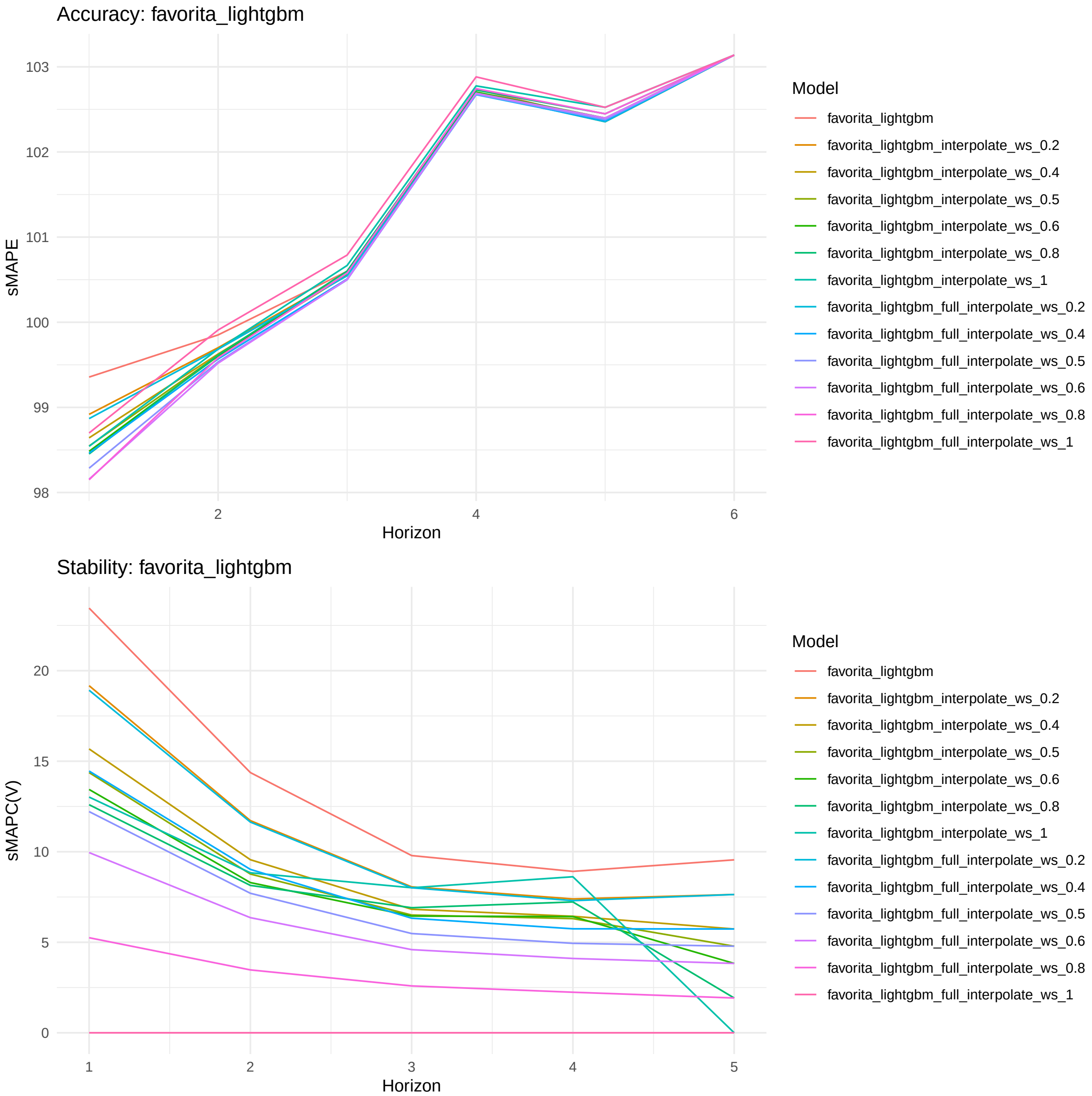


Figure B.3: Accuracy (top) and Vertical Stability (bottom) for LightGBM for the Favorita dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, whereas stability mostly increases (as sMAPC decreases).

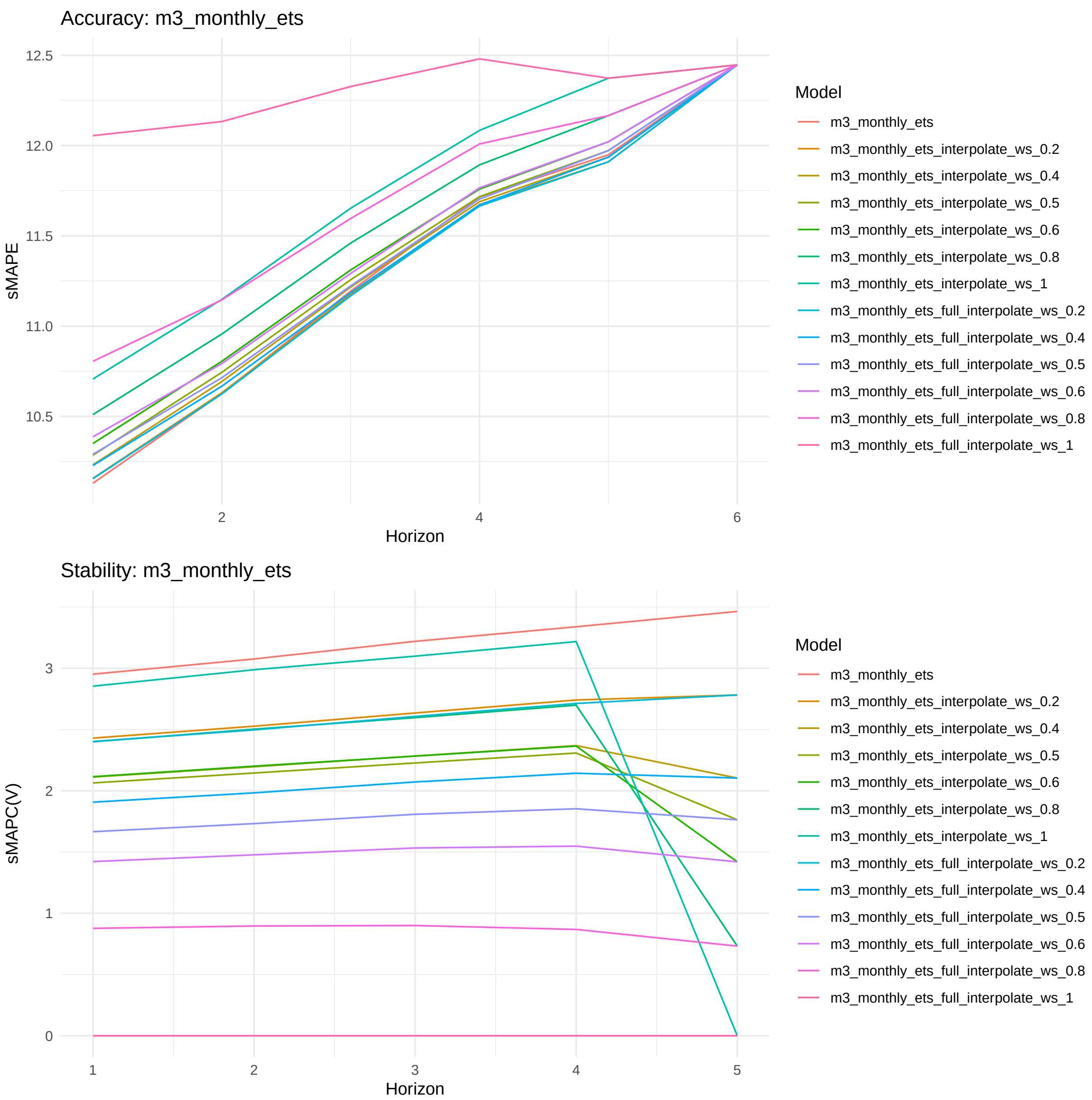


Figure B.4: Accuracy (top) and Vertical Stability (bottom) for ETS for the Monthly M3 dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, and stability also decreases (as sMAPC increases), except for the artefacts that stability for the second-largest horizon of partial interpolation is identical with full interpolation, and therefore is more stable.

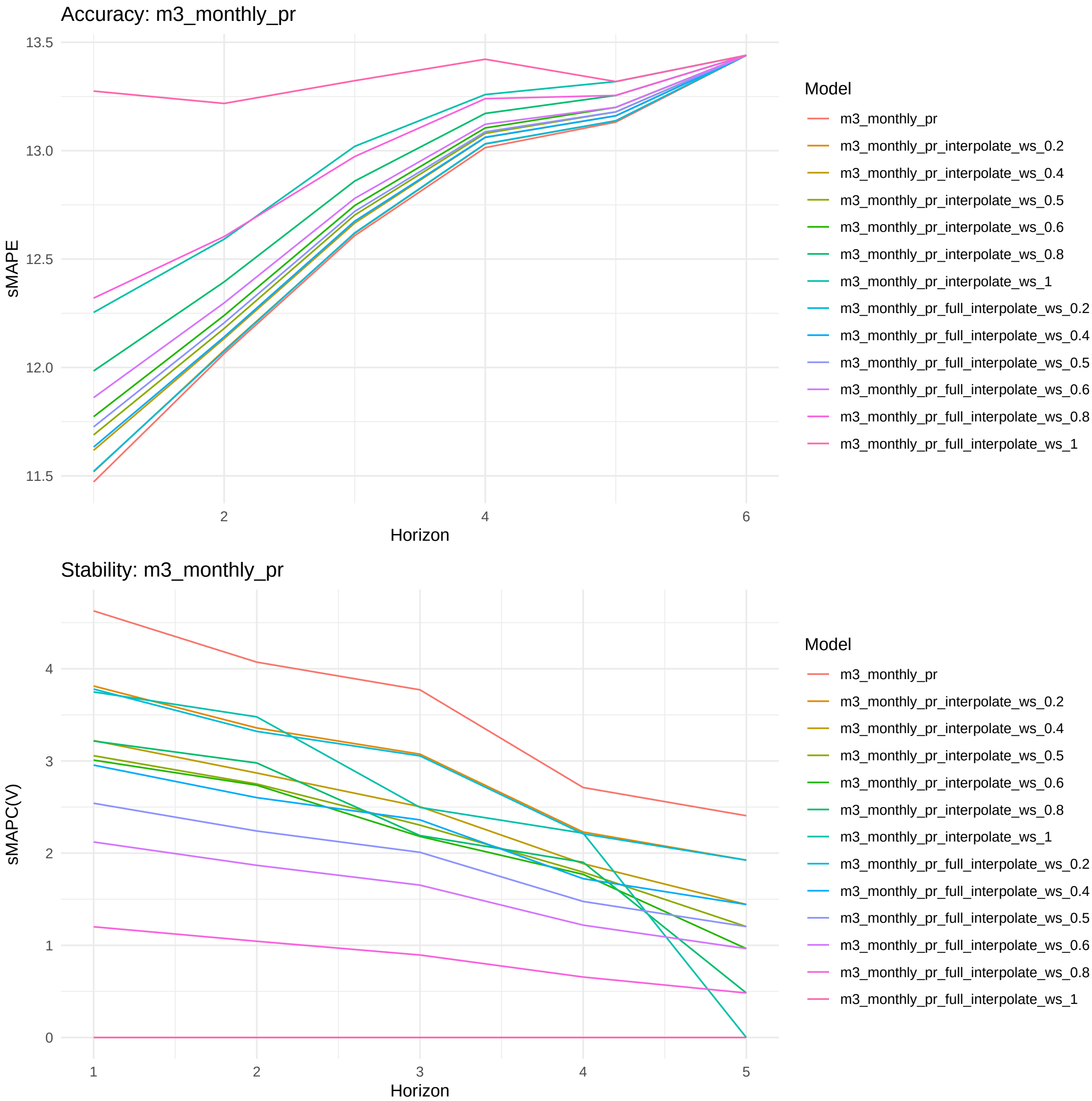


Figure B.5: Accuracy (top) and Vertical Stability (bottom) for PR for the Monthly M3 dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, whereas stability mostly increases (as sMAPC decreases).

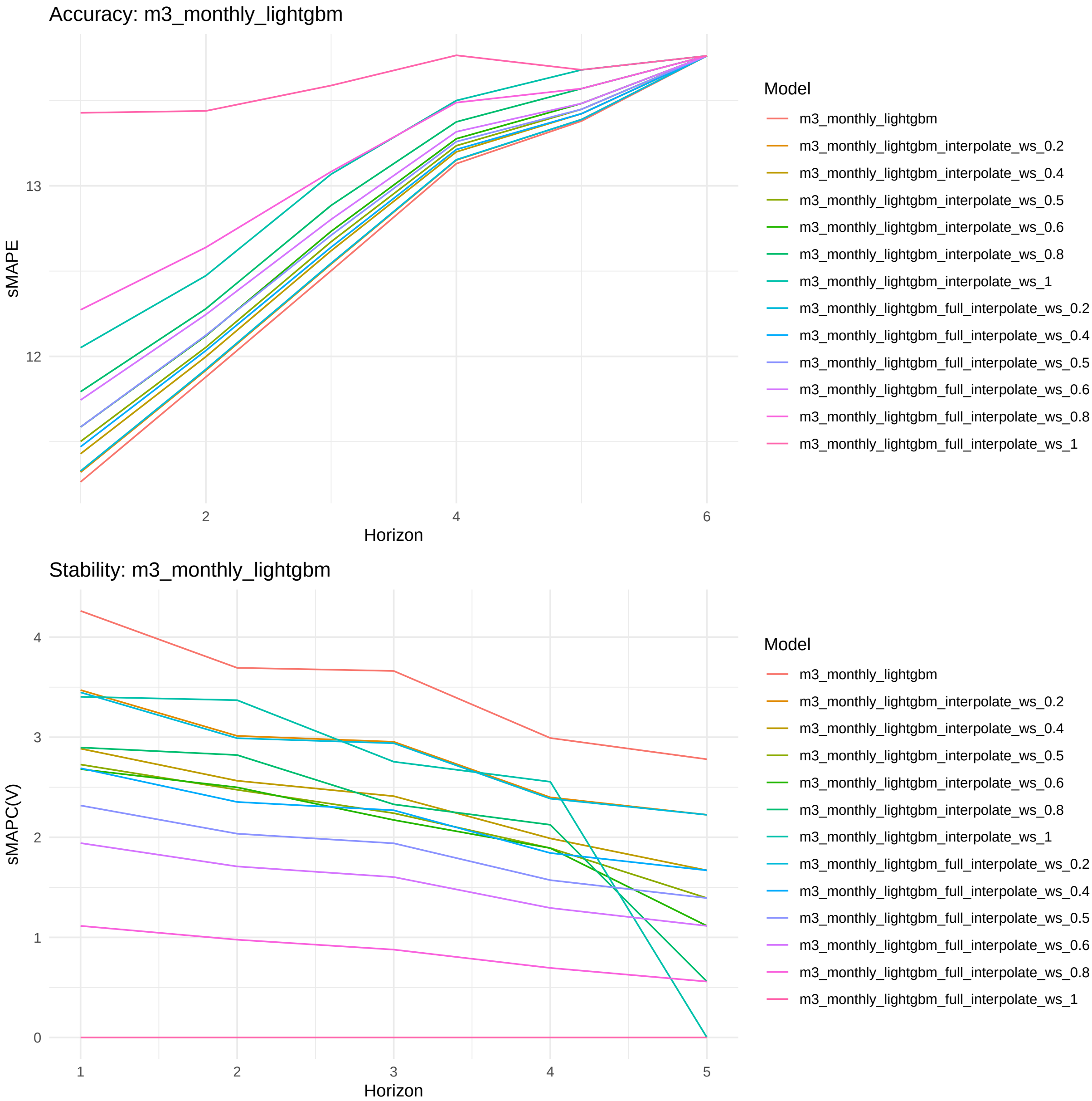


Figure B.6: Accuracy (top) and Vertical Stability (bottom) for LightGBM for the Monthly M3 dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, whereas stability mostly increases (as sMAPC decreases).

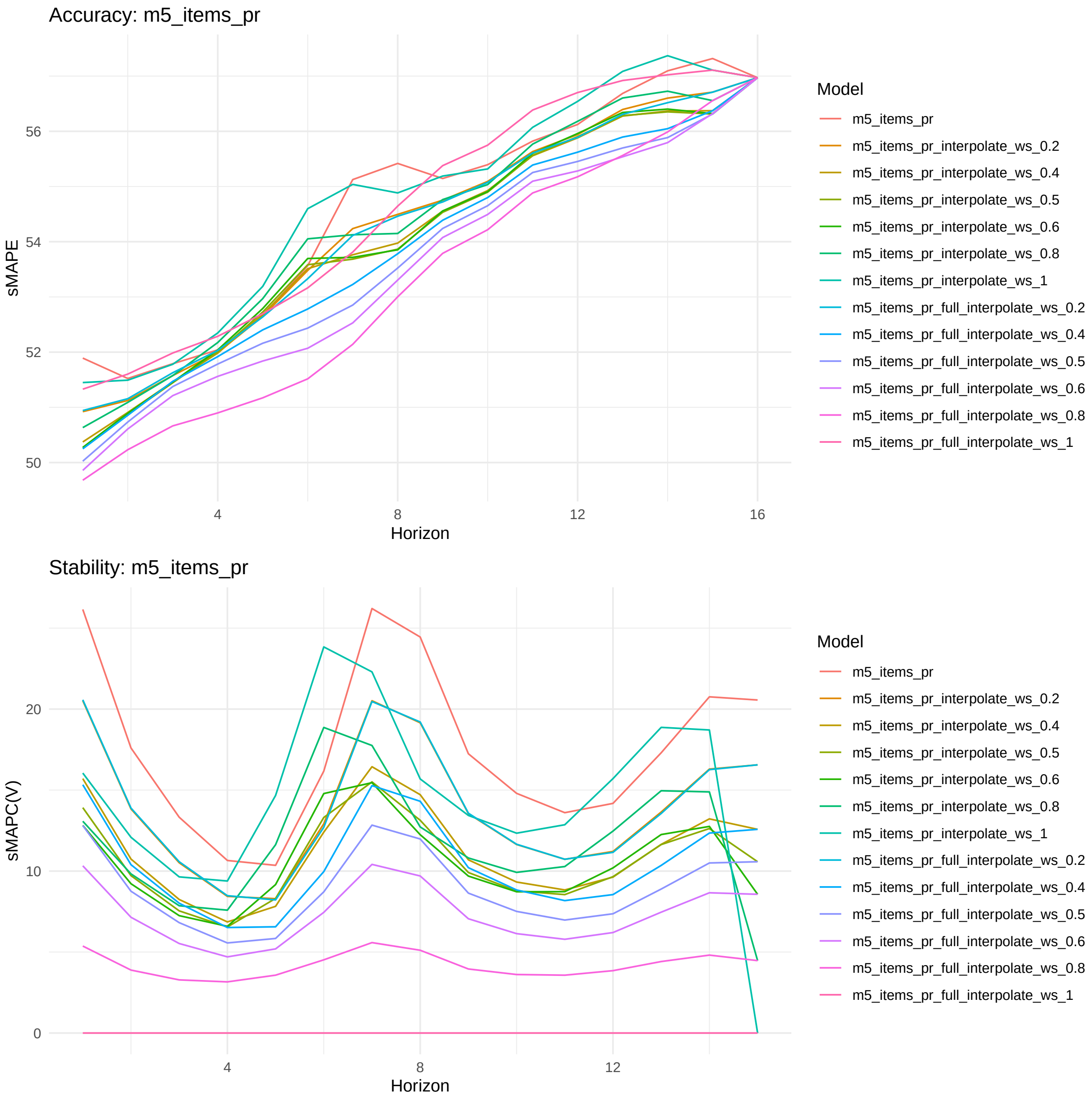
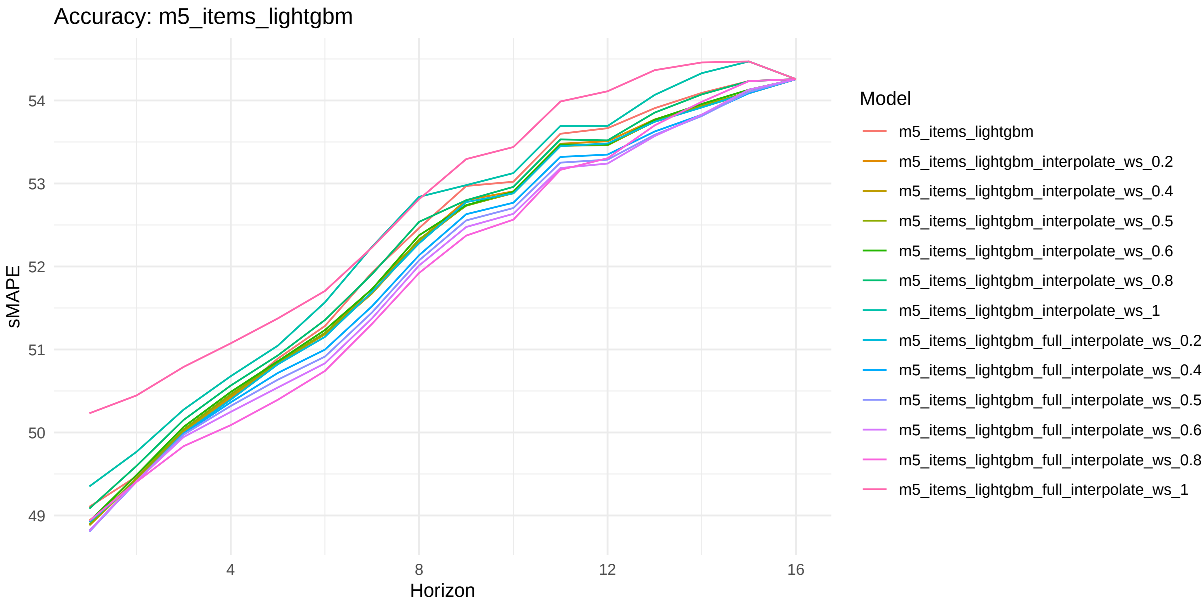


Figure B.7: Accuracy (top) and Vertical Stability (bottom) for PR for the M5 items dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, whereas stability has no monotonous relationship with the horizon.



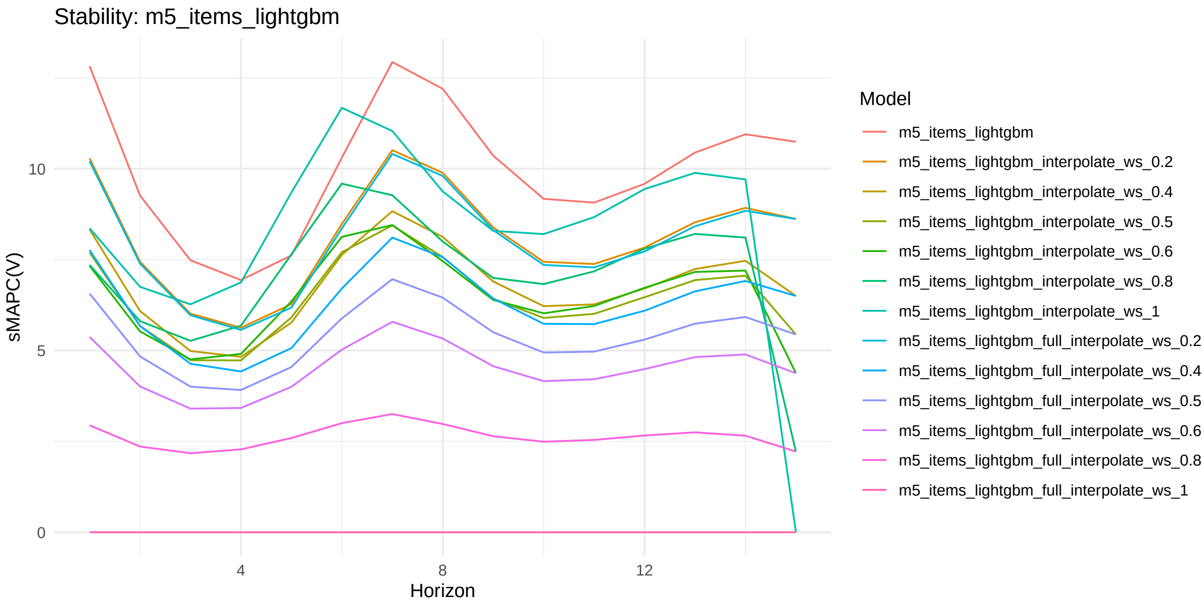
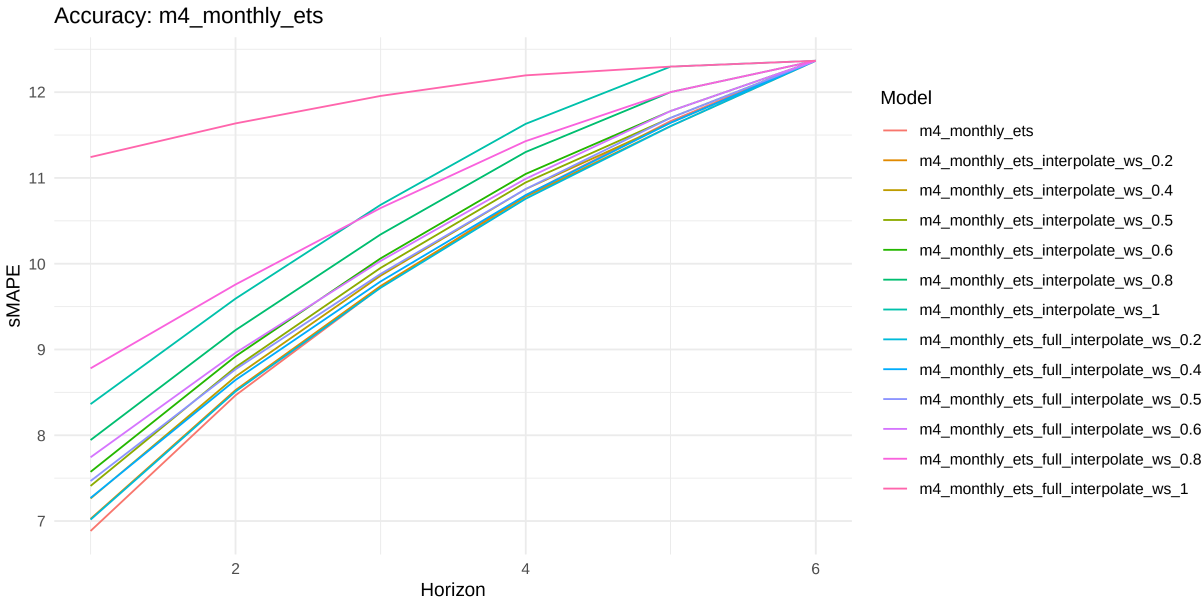


Figure B.8: Accuracy (top) and Vertical Stability (bottom) for LightGBM for the M5 items dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, whereas stability has no monotonous relationship with the horizon.



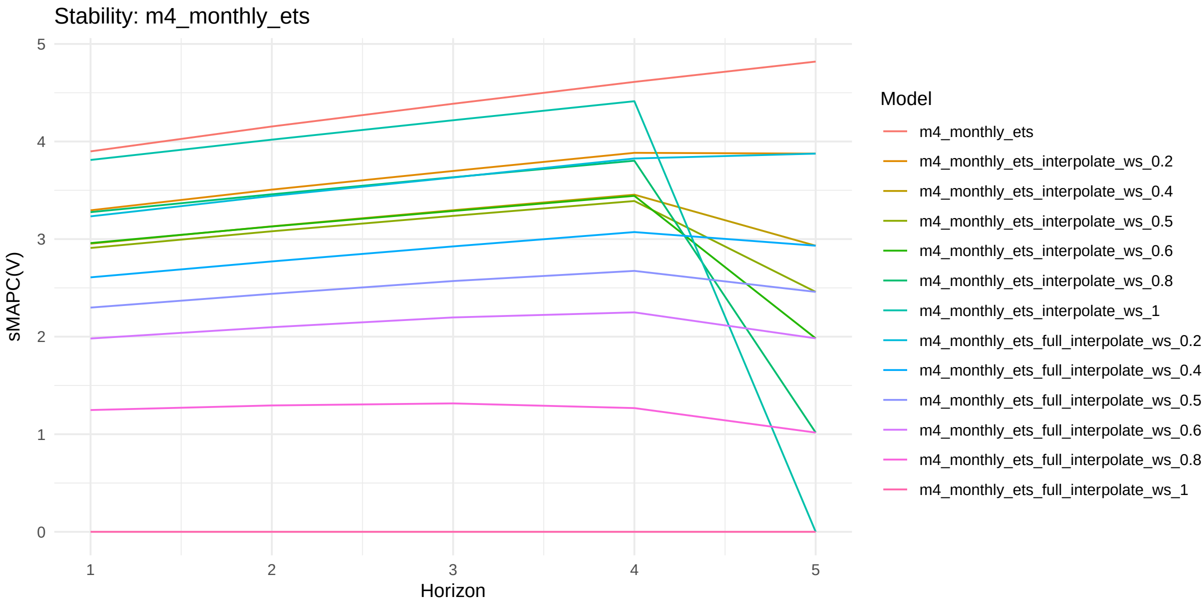


Figure B.9: Accuracy (top) and Vertical Stability (bottom) for ETS for the Monthly M4 dataset. We can see that accuracy decreases (as sMAPE increases) with an increasing horizon, and stability also decreases (as sMAPC increases), except for the artefacts that stability for the second-largest horizon of partial interpolation is identical with full interpolation, and therefore is more stable.