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***Modeling Approach Matters, But Not as Much as Preprocessing:
Comparison of Machine Learning and Traditional Revenue Forecasting Techniques***

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Appendix

Table A1. Monthly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
KKNN	(IHS) (Detrend)	0.998	0.449	0.277	2.343	1	3	757	
KKNN	(Inf Adj) (IHS) (Detrend)	1.000	0.452	0.276	2.346	2	4	759	
XGBOOST	(IHS) (Detrend)	1.041	0.503	0.274	2.461	3	9	755	
XGBOOST	(Inf Adj) (IHS) (Detrend)	1.044	0.508	0.336	2.443	4	10	756	
KKNN	(Inf Adj) (Log) (Detrend)	1.075	0.501	0.289	2.544	5	8	764	
KKNN	(Log) (Detrend)	1.075	0.501	0.290	2.547	6	7	763	
XGBOOST	(Inf Adj) (Log) (Detrend)	1.081	0.518	0.275	2.571	7	11	745	
XGBOOST	(Log) (Detrend)	1.088	0.531	0.276	2.622	8	12	748	
SNaïve*	(Inf Adj) (IHS) (Detrend)	1.128	1.037	0.117	8.293	9	37	822	
SNaïve*	(IHS) (Detrend)	1.134	1.041	0.115	8.338	10	38	822	
Linear Trend	(Inf Adj) (IHS) (Detrend)	1.192	0.431	0.472	2.318	11	1	747	
Linear Trend	(IHS) (Detrend)	1.194	0.433	0.467	2.318	12	2	747	
SNaïve*	(Inf Adj) (Log) (Detrend)	1.208	1.125	0.123	9.041	13	41	822	
DT ETS	(Inf Adj) (IHS)	1.213	0.752	0.203	3.456	14	23	759	
SNaïve*	(Log) (Detrend)	1.214	1.130	0.120	9.094	15	42	822	
ARIMA	(IHS)	1.224	0.651	0.223	3.155	16	13	744	
ARIMA	(Inf Adj) (IHS)	1.226	0.678	0.257	3.286	17	16	747	
KKNN	(Inf Adj) (IHS) (SA)	1.255	0.716	0.181	3.361	18	18	760	
DT ETS	(IHS)	1.262	0.801	0.206	3.720	19	28	767	
Linear Trend	(Inf Adj) (Log) (Detrend)	1.273	0.473	0.501	2.509	20	5	750	
Linear Trend	(Log) (Detrend)	1.276	0.474	0.495	2.516	21	6	750	
KKNN	(IHS) (SA)	1.285	0.713	0.188	3.395	22	17	761	
DT ETS	(Log)	1.306	0.819	0.207	3.916	23	29	762	
DT ETS	(Inf Adj) (Log)	1.307	0.820	0.216	3.912	24	30	759	
ARIMA	(Inf Adj) (Log)	1.313	0.738	0.267	3.557	25	22	749	
ARIMA	(Log)	1.316	0.716	0.231	3.464	26	19	748	
KKNN	(Inf Adj) (Log) (SA)	1.337	0.771	0.189	3.607	27	25	760	
KKNN	(Log) (SA)	1.369	0.768	0.197	3.637	28	24	761	
Mean*	(Inf Adj) (IHS) (Detrend)	1.381	0.777	0.476	6.782	29	26	822	
Mean*	(IHS) (Detrend)	1.384	0.779	0.471	6.802	30	27	822	
XGBOOST	(Inf Adj) (IHS) (SA)	1.466	0.665	0.302	3.374	31	14	753	
Mean*	(Inf Adj) (Log) (Detrend)	1.474	0.846	0.505	7.456	32	31	822	
Mean*	(Log) (Detrend)	1.478	0.849	0.500	7.480	33	32	822	
XGBOOST	(Inf Adj) (Log) (SA)	1.548	0.717	0.304	3.597	34	20	754	
XGBOOST	(IHS) (SA)	1.566	0.678	0.339	3.427	35	15	751	
SNaïve*	(Inf Adj) (IHS) (SA)	1.608	1.687	0.170	30.430	36	55	822	
SNaïve*	(Inf Adj) (IHS)	1.610	1.688	0.170	30.373	37	56	822	
SNaïve*	(IHS) (SA)	1.634	1.669	0.134	30.189	38	53	822	
SNaïve*	(IHS)	1.636	1.670	0.134	30.132	39	54	822	
Naïve*	(Inf Adj) (IHS) (Detrend)	1.644	1.502	0.462	22.468	40	45	822	
XGBOOST	(Log) (SA)	1.646	0.723	0.355	3.614	41	21	750	

Table A1. Monthly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
Naïve*	(IHS) (Detrend)	1.650	1.509	0.459	22.562	42	46	822	
Naïve*	(IHS) (SA)	1.651	1.799	0.184	22.556	43	61	822	
Drift*	(Inf Adj) (IHS)	1.660	1.538	0.469	23.209	44	47	822	
	(Detrend)								
Drift*	(IHS) (Detrend)	1.665	1.544	0.467	23.308	45	48	822	
Naïve*	(Inf Adj) (IHS)	1.676	1.812	0.205	22.710	46	62	822	
	(SA)								
SNaïve*	(Inf Adj) (Log)	1.721	1.841	0.177	33.773	47	65	822	
	(SA)								
SNaïve*	(Inf Adj) (Log)	1.722	1.841	0.177	33.702	48	66	822	
SNaïve*	(Log) (SA)	1.748	1.822	0.140	33.517	49	63	822	
SNaïve*	(Log)	1.750	1.823	0.140	33.444	50	64	822	
Linear Trend	(Inf Adj) (IHS)	1.753	1.093	0.185	4.898	51	39	776	
	(SA)								
Naïve*	(Inf Adj) (Log)	1.756	1.621	0.479	23.987	52	49	822	
	(Detrend)								
Naïve*	(Log) (Detrend)	1.762	1.628	0.476	24.094	53	50	822	
Naïve*	(Log) (SA)	1.766	1.943	0.193	24.404	54	75	822	
Drift*	(Inf Adj) (Log)	1.773	1.659	0.487	24.779	55	51	822	
	(Detrend)								
Drift*	(Log) (Detrend)	1.779	1.666	0.484	24.891	56	52	822	
Naïve*	(Inf Adj) (Log)	1.793	1.956	0.215	24.566	57	76	822	
	(SA)								
Linear Trend	(IHS) (SA)	1.811	1.118	0.197	5.053	58	40	777	
Drift*	(Inf Adj) (IHS)	1.812	1.879	0.195	23.956	59	69	822	
	(SA)								
Linear Trend	(Inf Adj) (IHS)	1.821	0.896	0.434	4.321	60	33	750	
Drift*	(Inf Adj) (IHS)	1.834	1.781	0.428	24.261	61	59	822	
Drift*	(IHS) (SA)	1.835	1.886	0.194	24.064	62	70	822	
Drift*	(IHS)	1.838	1.786	0.426	24.273	63	60	822	
Naïve*	(Inf Adj) (IHS)	1.840	1.731	0.491	23.288	64	58	822	
Linear Trend	(Inf Adj) (Log)	1.873	1.177	0.192	5.296	65	43	777	
	(SA)								
Naïve*	(IHS)	1.883	1.729	0.474	23.514	66	57	822	
Linear Trend	(IHS)	1.917	0.956	0.443	4.526	67	34	760	
Linear Trend	(Log) (SA)	1.930	1.198	0.205	5.397	68	44	777	
Drift*	(Inf Adj) (Log)	1.938	2.027	0.205	25.913	69	79	822	
	(SA)								
Linear Trend	(Inf Adj) (Log)	1.954	0.979	0.451	4.707	70	35	754	
Drift*	(Inf Adj) (Log)	1.959	1.923	0.445	25.883	71	72	822	
Drift*	(Log) (SA)	1.963	2.035	0.204	26.035	72	80	822	
Drift*	(Log)	1.964	1.928	0.443	25.900	73	73	822	
Naïve*	(Inf Adj) (Log)	1.965	1.870	0.510	24.846	74	68	822	
Naïve*	(Log)	2.011	1.869	0.492	25.090	75	67	822	
Linear Trend	(Log)	2.046	1.030	0.460	4.924	76	36	761	
NNAR	(Inf Adj) (IHS)	2.763	1.902	0.286	8.890	77	71	756	
	(Detrend)								
NNAR	(IHS) (Detrend)	2.769	1.939	0.211	8.931	78	74	747	
NNAR	(Inf Adj) (Log)	2.885	1.977	0.249	9.119	79	77	749	
	(Detrend)								
NNAR	(Log) (Detrend)	2.946	2.009	0.235	9.612	80	78	751	
NNAR	(Inf Adj) (IHS)	2.986	2.130	0.288	10.274	81	81	747	
	(SA)								
NNAR	(IHS) (SA)	3.044	2.242	0.298	10.315	82	83	749	
NNAR	(Log) (SA)	3.152	2.199	0.255	10.334	83	82	742	
NNAR	(Inf Adj) (Log)	3.274	2.508	0.203	11.562	84	84	749	
	(SA)								

Table A1. Monthly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
Mean*	(Inf Adj) (IHS) (SA)	4.119	3.358	0.403	38.742	85	86	822	
Mean*	(Inf Adj) (IHS)	4.187	3.307	0.539	38.664	86	85	822	
Mean*	(Inf Adj) (Log) (SA)	4.386	3.598	0.423	42.990	87	90	822	
Mean*	(Inf Adj) (Log)	4.458	3.545	0.569	42.892	88	89	822	
Mean*	(IHS) (SA)	6.135	3.517	0.685	35.038	89	88	822	
Mean*	(IHS)	6.146	3.502	0.798	34.961	90	87	822	
Mean*	(Log) (SA)	6.530	3.766	0.728	38.899	91	94	822	
Mean*	(Log)	6.542	3.750	0.849	38.803	92	93	822	
XGBOOST	(Detrend)	10.601	5.135	2.547	24.691	93	97	749	
XGBOOST	(Inf Adj) (Detrend)	10.708	5.229	2.395	25.180	94	98	752	
KKNN	(Inf Adj) (Detrend)	11.313	3.846	4.048	21.449	95	95	725	
KKNN	(Detrend)	11.327	3.880	3.950	21.547	96	96	727	
ARIMA	Sales Taxes	13.468	5.976	4.215	31.416	97	99	728	
ARIMA	(Inf Adj)	13.642	6.375	3.762	33.439	98	102	728	
KKNN	(Inf Adj) (SA)	13.820	6.680	2.808	33.311	99	104	741	
Linear Trend	(Inf Adj) (Detrend)	13.824	3.639	5.791	21.867	100	91	692	
Linear Trend	(Detrend)	13.854	3.662	5.765	21.966	101	92	694	
XGBOOST	(Inf Adj) (SA)	13.906	6.348	2.314	31.326	102	101	747	
KKNN	(SA)	13.930	6.484	3.028	31.625	103	103	744	
DT ETS	Sales Taxes	14.035	7.783	3.679	37.873	104	107	747	
SNaïve*	(Detrend)	14.055	25.012	1.813	505.391	105	117	822	Outlier
SNaïve*	(Inf Adj) (Detrend)	14.057	25.111	1.791	509.706	106	118	822	Outlier
XGBOOST	(SA)	14.075	6.036	3.032	30.700	107	100	742	
DT ETS	(Inf Adj)	14.313	8.214	3.449	41.329	108	108	751	
Linear Trend	(SA)	17.158	9.079	2.771	45.516	109	109	757	
Linear Trend	(Inf Adj) (SA)	17.492	9.620	3.090	47.164	110	110	760	
Mean*	(Inf Adj) (Detrend)	17.693	20.097	5.830	415.490	111	112	822	Outlier
Mean*	(Detrend)	17.697	20.095	5.792	414.300	112	111	822	Outlier
Linear Trend	Sales Taxes	18.377	7.382	6.731	40.154	113	105	733	
Linear Trend	(Inf Adj)	18.679	7.705	6.532	41.329	114	106	733	
Naïve*	(Detrend)	19.093	30.182	6.133	518.545	115	119	822	Outlier
Naïve*	(Inf Adj) (Detrend)	19.101	30.232	6.176	520.981	116	120	822	Outlier
Drift*	(Detrend)	19.308	30.885	6.397	525.229	117	121	822	Outlier
Drift*	(Inf Adj) (Detrend)	19.317	30.936	6.445	527.712	118	122	822	Outlier
SNaïve*	Sales Taxes	20.391	45.633	2.195	971.167	119	131	822	Outlier
SNaïve*	(SA)	20.391	45.633	2.195	971.167	119	131	822	Outlier
Naïve*	(SA)	20.394	37.815	2.818	698.491	120	127	822	Outlier
SNaïve*	(Inf Adj)	20.584	47.205	2.670	998.250	121	132	822	Outlier
SNaïve*	(Inf Adj) (SA)	20.584	47.205	2.670	998.250	121	133	822	Outlier
Drift*	Sales Taxes	20.870	33.579	6.509	652.210	122	125	822	Outlier
Naïve*	(Inf Adj)	20.879	33.014	6.791	636.578	123	124	822	Outlier
Naïve*	Sales Taxes	20.959	32.022	7.013	620.988	124	123	822	Outlier
Drift*	(Inf Adj)	20.976	34.347	6.568	667.828	125	126	822	Outlier
Naïve*	(Inf Adj) (SA)	21.052	38.875	3.045	717.587	126	128	822	Outlier
Drift*	(SA)	21.529	39.518	2.855	726.542	127	129	822	Outlier
Drift*	(Inf Adj) (SA)	22.062	40.282	2.814	739.927	128	130	822	Outlier
NNAR	(Inf Adj) (SA)	32.196	22.888	3.590	108.948	129	114	717	Outlier
NNAR	(Detrend)	33.311	21.890	2.979	106.698	130	113	739	Outlier

Table A1. Monthly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
NNAR	(SA)	34.173	24.884	3.664	124.359	131	116	730	Outlier
Mean*	(Inf Adj) (SA)	34.688	66.577	4.719	1,767.639	132	137	822	Outlier
Mean*	(Inf Adj)	34.825	65.666	6.618	1,760.711	133	136	822	Outlier
NNAR	(Inf Adj)	35.781	24.230	3.120	116.769	134	115	751	Outlier
	(Detrend)								
Mean*	Sales Taxes	43.046	48.370	9.555	1,302.723	135	134	822	Outlier
Mean*	(SA)	44.012	49.076	9.370	1,307.522	136	135	822	Outlier

Table A2: Quarterly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
Linear Trend	(Inf Adj) (IHS) (Detrend)	0.406	0.261	0.040	1.226	1	5	893	
Linear Trend	(IHS) (Detrend)	0.408	0.261	0.043	1.230	2	6	893	
Linear Trend	(Inf Adj) (Log) (Detrend)	0.431	0.279	0.042	1.314	3	7	893	
Linear Trend	(Log) (Detrend)	0.435	0.283	0.045	1.332	4	8	895	
KKNN	(Inf Adj) (IHS) (Detrend)	0.474	0.312	0.027	1.472	5	9	900	
KKNN	(IHS) (Detrend)	0.475	0.313	0.032	1.465	6	10	900	
KKNN	(Inf Adj) (Log) (Detrend)	0.502	0.333	0.028	1.571	7	11	899	
KKNN	(Log) (Detrend)	0.505	0.336	0.033	1.581	8	12	900	
Mean*	(Inf Adj) (IHS) (Detrend)	0.544	0.594	0.040	7.161	9	16	976	
Mean*	(IHS) (Detrend)	0.546	0.596	0.043	7.182	10	17	976	
Mean*	(Inf Adj) (Log) (Detrend)	0.580	0.637	0.041	7.605	11	20	976	
Mean*	(Log) (Detrend)	0.582	0.639	0.045	7.629	12	22	976	
XGBOOST	(Inf Adj) (IHS) (Detrend)	0.607	0.206	0.223	1.190	13	1	840	
XGBOOST	(IHS) (Detrend)	0.608	0.209	0.216	1.215	14	2	842	
XGBOOST	(Inf Adj) (Log) (Detrend)	0.634	0.232	0.208	1.319	15	3	847	
XGBOOST	(Log) (Detrend)	0.635	0.236	0.201	1.329	16	4	850	
SNaïve*	(Inf Adj) (IHS) (Detrend)	0.706	0.835	0.029	12.133	17	37	976	
SNaïve*	(IHS) (Detrend)	0.708	0.838	0.034	12.188	18	38	976	
SNaïve*	(Inf Adj) (Log) (Detrend)	0.753	0.897	0.030	12.953	19	39	976	
SNaïve*	(Log) (Detrend)	0.755	0.901	0.035	13.015	20	40	976	
Naïve*	(Inf Adj) (IHS) (Detrend)	0.833	1.027	0.056	12.735	21	41	976	
Naïve*	(IHS) (Detrend)	0.836	1.031	0.046	12.805	22	42	976	
Drift*	(Inf Adj) (IHS) (Detrend)	0.852	1.055	0.058	13.141	23	43	976	
Drift*	(IHS) (Detrend)	0.855	1.059	0.051	13.212	24	44	976	
DT ETS	(Inf Adj) (IHS)	0.875	0.554	0.086	2.574	25	14	367	
Naïve*	(Inf Adj) (Log) (Detrend)	0.887	1.101	0.059	13.689	26	45	976	
Naïve*	(Log) (Detrend)	0.891	1.106	0.049	13.769	27	46	976	
Drift*	(Inf Adj) (Log) (Detrend)	0.907	1.131	0.062	14.126	28	50	976	
DT ETS	(IHS)	0.907	0.550	0.091	2.589	29	13	374	
Drift*	(Log) (Detrend)	0.911	1.136	0.054	14.207	30	52	976	
DT ETS	(Inf Adj) (IHS)	0.923	0.649	0.080	2.897	31	24	540	
DT ETS	(IHS)	0.935	0.626	0.062	2.717	32	19	529	
ARIMA	(Inf Adj) (IHS)	0.938	0.641	0.097	2.973	33	23	902	
DT ETS	(Inf Adj) (Log)	0.943	0.609	0.090	2.846	34	18	367	
DT ETS	(Log)	0.965	0.588	0.096	2.772	35	15	375	
ARIMA	(IHS)	0.974	0.637	0.078	2.973	36	21	903	
DT ETS	(Inf Adj) (Log)	0.975	0.691	0.085	3.015	37	32	542	
KKNN	(Inf Adj) (IHS) (SA)	0.979	0.683	0.088	3.087	38	29	906	
DT ETS	(Log)	0.986	0.666	0.064	2.914	39	25	526	
ARIMA	(Inf Adj) (Log)	0.998	0.690	0.101	3.184	40	31	903	
KKNN	(IHS) (SA)	1.019	0.684	0.055	3.054	41	30	907	
ARIMA	(Log)	1.032	0.678	0.081	3.166	42	27	902	

Table A2: Quarterly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
KKNN	(Inf Adj) (Log)	1.044	0.737	0.092	3.352	43	36	908	
KKNN	(SA)								
KKNN	(Log) (SA)	1.084	0.734	0.058	3.303	44	35	908	
Naïve*	(Inf Adj) (IHS)	1.192	1.428	0.058	16.941	45	60	976	
Naïve*	(SA)								
Naïve*	(Inf Adj) (IHS)	1.196	1.428	0.060	16.888	46	59	976	
Naïve*	(IHS) (SA)	1.210	1.422	0.093	16.744	47	58	976	
Naïve*	(IHS)	1.217	1.419	0.074	16.686	48	57	976	
Drift*	(Inf Adj) (IHS)	1.221	1.458	0.050	16.536	49	61	976	
Drift*	(SA)								
Drift*	(Inf Adj) (IHS)	1.225	1.466	0.096	16.863	50	63	976	
Drift*	(IHS) (SA)	1.236	1.463	0.055	16.528	51	62	976	
Drift*	(IHS)	1.239	1.471	0.083	16.860	52	64	976	
Naïve*	(Inf Adj) (Log)	1.269	1.534	0.061	18.511	53	72	976	
Naïve*	(SA)								
Naïve*	(Inf Adj) (Log)	1.274	1.534	0.062	18.449	54	71	976	
Naïve*	(Log) (SA)	1.289	1.527	0.097	18.299	55	70	976	
Naïve*	(Log)	1.296	1.524	0.077	18.232	56	69	976	
Drift*	(Inf Adj) (Log)	1.300	1.566	0.053	17.731	57	73	976	
Drift*	(SA)								
Drift*	(Inf Adj) (Log)	1.304	1.574	0.100	18.081	58	75	976	
Drift*	(Log) (SA)	1.316	1.571	0.057	17.816	59	74	976	
Drift*	(Log)	1.319	1.580	0.086	18.080	60	76	976	
SNaïve*	(Inf Adj) (IHS)	1.332	1.518	0.058	25.068	61	68	976	
SNaïve*	(SA)								
SNaïve*	(Inf Adj) (IHS)	1.333	1.518	0.058	25.048	62	67	976	
SNaïve*	(IHS) (SA)	1.368	1.506	0.053	24.851	63	66	976	
SNaïve*	(IHS)	1.369	1.506	0.053	24.830	64	65	976	
XGBOOST	(Inf Adj) (IHS)	1.411	0.668	0.174	3.136	65	26	904	
XGBOOST	(SA)								
SNaïve*	(Inf Adj) (Log)	1.418	1.634	0.061	27.366	66	80	976	
SNaïve*	(SA)								
SNaïve*	(Inf Adj) (Log)	1.419	1.633	0.061	27.341	67	79	976	
SNaïve*	(Log) (SA)	1.457	1.622	0.055	27.134	68	78	976	
SNaïve*	(Log)	1.457	1.622	0.055	27.109	69	77	976	
XGBOOST	(Inf Adj) (Log)	1.464	0.716	0.171	3.332	70	33	907	
XGBOOST	(SA)								
XGBOOST	(IHS) (SA)	1.525	0.683	0.165	3.221	71	28	898	
Linear Trend	(IHS) (SA)	1.534	1.108	0.056	4.993	72	47	926	
Linear Trend	(Inf Adj) (IHS)	1.534	1.134	0.066	5.019	73	51	931	
Linear Trend	(SA)								
Linear Trend	(Inf Adj) (IHS)	1.536	1.125	0.077	4.981	74	49	930	
Linear Trend	(IHS)	1.543	1.111	0.070	5.050	75	48	927	
XGBOOST	(Log) (SA)	1.589	0.733	0.163	3.455	76	34	902	
Linear Trend	(Inf Adj) (Log)	1.622	1.188	0.081	5.280	77	55	928	
Linear Trend	(Inf Adj) (Log)	1.624	1.202	0.069	5.286	78	56	930	
Linear Trend	(SA)								
Linear Trend	(Log) (SA)	1.631	1.185	0.058	5.358	79	54	927	
Linear Trend	(Log)	1.633	1.177	0.073	5.373	80	53	926	
NNAR	(IHS) (Detrend)	2.283	2.271	0.074	10.186	81	81	885	
NNAR	(Inf Adj) (IHS)	2.506	2.577	0.077	11.811	82	82	893	
NNAR	(Detrend)								
NNAR	(Log) (Detrend)	2.514	2.583	0.076	11.850	83	83	878	
NNAR	(Inf Adj) (Log)	2.518	2.595	0.071	11.947	84	84	879	
NNAR	(Detrend)								
NNAR	(Inf Adj) (IHS)	3.187	3.203	0.075	14.759	85	87	880	
NNAR	(SA)								

Table A2: Quarterly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
NNAR	(IHS) (SA)	3.391	3.483	0.080	16.054	86	90	885	
NNAR	(Inf Adj) (Log) (SA)	3.548	3.583	0.078	17.127	87	97	886	
NNAR	(Log) (SA)	3.595	3.721	0.072	17.612	88	98	879	
Mean*	(Inf Adj) (IHS) (SA)	3.903	3.347	0.051	31.873	89	89	976	
Mean*	(Inf Adj) (IHS)	3.907	3.347	0.088	31.840	90	88	976	
Mean*	(Inf Adj) (Log) (SA)	4.140	3.567	0.054	34.796	91	96	976	
Mean*	(Inf Adj) (Log)	4.144	3.566	0.091	34.755	92	95	976	
Linear Trend	(Detrend)	5.037	2.868	0.595	13.808	93	85	887	
Linear Trend	(Inf Adj) (Detrend)	5.063	2.924	0.593	13.957	94	86	891	
Mean*	(IHS) (SA)	5.815	3.539	0.421	28.688	95	94	976	
Mean*	(IHS)	5.817	3.538	0.399	28.655	96	93	976	
KKNN	(Detrend)	5.919	3.525	0.526	16.439	97	91	905	
KKNN	(Inf Adj) (Detrend)	5.922	3.526	0.447	16.339	98	92	905	
Mean*	(Log) (SA)	6.166	3.775	0.445	31.330	99	100	976	
Mean*	(Log)	6.168	3.774	0.426	31.290	100	99	976	
XGBOOST	(Inf Adj) (Detrend)	6.291	3.876	0.847	17.744	101	101	892	
XGBOOST	(Detrend)	6.370	3.952	0.802	18.206	102	102	895	
Mean*	(Inf Adj) (Detrend)	6.956	11.081	0.646	252.395	103	116	976	
Mean*	(Detrend)	6.973	11.118	0.615	253.793	104	117	976	
SNaïve*	(Detrend)	8.607	11.688	0.621	244.444	105	120	976	
SNaïve*	(Inf Adj) (Detrend)	8.613	11.660	0.480	242.755	106	119	976	
DT ETS	(Inf Adj)	10.472	6.271	1.664	29.357	107	104	520	
Naïve*	(Inf Adj) (Detrend)	10.483	16.140	0.709	319.689	108	121	976	
Naïve*	(Detrend)	10.497	16.176	0.594	321.340	109	122	976	
Drift*	(Inf Adj) (Detrend)	10.691	16.441	0.747	322.102	110	123	976	
Drift*	(Detrend)	10.706	16.476	0.651	323.769	111	124	976	
DT ETS	Sales Taxes	10.763	5.904	1.287	27.806	112	103	498	
ARIMA	(Inf Adj)	10.930	6.631	1.664	31.755	113	109	882	
DT ETS	(Inf Adj)	11.070	6.404	1.223	30.613	114	105	376	
XGBOOST	(Inf Adj) (SA)	11.071	6.764	0.919	32.282	115	110	909	
KKNN	(Inf Adj) (SA)	11.300	6.887	1.326	33.001	116	112	889	
ARIMA	Sales Taxes	11.301	6.555	1.282	31.736	117	107	890	
DT ETS	Sales Taxes	11.389	6.567	1.348	30.890	118	108	403	
XGBOOST	(SA)	11.455	6.413	1.105	30.556	119	106	905	
KKNN	(SA)	11.695	6.846	0.875	32.768	120	111	894	
Naïve*	(SA)	14.341	19.463	1.552	343.554	121	125	976	Outlier
Naïve*	(Inf Adj) (SA)	14.392	20.168	0.667	353.673	122	129	976	Outlier
Drift*	(SA)	14.462	19.951	0.861	313.447	123	128	976	Outlier
Naïve*	Sales Taxes	14.597	19.844	1.300	338.317	124	127	976	Outlier
Naïve*	(Inf Adj)	14.625	20.581	1.080	348.468	125	132	976	Outlier
Drift*	(Inf Adj) (SA)	14.634	19.842	0.689	287.614	126	126	976	Outlier
Drift*	Sales Taxes	14.688	20.409	0.939	308.332	127	131	976	Outlier
Drift*	(Inf Adj)	14.853	20.352	1.055	293.970	128	130	976	Outlier
Linear Trend	Sales Taxes	15.993	10.632	1.519	48.087	129	113	917	
Linear Trend	(SA)	16.149	11.046	1.365	50.051	130	115	925	
Linear Trend	(Inf Adj) (SA)	16.198	11.148	1.155	50.148	131	118	921	
Linear Trend	(Inf Adj)	16.213	11.003	1.318	49.704	132	114	918	

Table A2: Quarterly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
SNaïve*	(Inf Adj)	16.917	32.030	1.031	849.517	133	137	976	Outlier
SNaïve*	(Inf Adj) (SA)	16.917	32.030	1.031	849.517	133	137	976	Outlier
SNaïve*	Sales Taxes	16.962	30.991	0.924	826.630	134	136	976	Outlier
SNaïve*	(SA)	16.962	30.991	0.924	826.630	134	135	976	Outlier
NNAR	(Inf Adj)	28.973	29.151	0.795	135.895	135	133	878	Outlier
	(Detrend)								
NNAR	(Detrend)	29.346	29.616	0.487	137.633	136	134	886	Outlier
Mean*	(Inf Adj)	33.764	53.186	1.482	1,553.745	137	142	976	Outlier
Mean*	(Inf Adj) (SA)	33.768	53.573	0.780	1,567.751	138	143	976	Outlier
NNAR	(Inf Adj) (SA)	38.519	37.729	1.563	180.970	139	138	876	Outlier
NNAR	(SA)	39.714	40.046	1.146	183.322	140	141	885	Outlier
Mean*	Sales Taxes	43.659	38.926	2.998	1,146.257	141	139	976	Outlier
Mean*	(SA)	43.719	39.220	4.456	1,156.694	142	140	976	Outlier

Table A3. Yearly Sales Tax Forecast Accuracy, Complete Results

Model	Preprocessing	MAPE				Rank		Forecasts	Modeling/ Preprocessing Outlier
		Average	Standard Deviation	Min	Max	Average	Standard Deviation		
Drift*	(Inf Adj) (IHS)	1.400	1.771	0.032	20.717	1	18	1005	
Drift*	(IHS)	1.405	1.783	0.034	20.462	2	19	1005	
ARIMA	(Inf Adj) (IHS)	1.437	0.951	0.060	4.336	3	1	942	
Naïve*	(Inf Adj) (IHS)	1.447	1.609	0.048	17.739	4	13	1005	
DT ETS	(IHS)	1.460	1.318	0.040	5.772	5	9	939	
Drift*	(Inf Adj) (Log)	1.480	1.888	0.033	22.278	6	22	1005	
Drift*	(Log)	1.487	1.901	0.036	22.009	7	23	1005	
DT ETS	(Inf Adj) (IHS)	1.489	1.335	0.040	5.886	8	10	939	
Linear Trend	(IHS)	1.498	1.134	0.058	5.066	9	5	953	
Linear Trend	(Inf Adj) (IHS)	1.511	1.145	0.045	5.286	10	6	951	
ARIMA	(Inf Adj) (Log)	1.512	1.003	0.063	4.574	11	2	941	
Naïve*	(Inf Adj) (Log)	1.529	1.714	0.051	19.076	12	15	1005	
DT ETS	(Log)	1.541	1.396	0.042	6.129	13	11	940	
Naïve*	(IHS)	1.551	1.613	0.063	18.093	14	14	1005	
DT ETS	(Inf Adj) (Log)	1.570	1.413	0.041	6.208	15	12	941	
Linear Trend	(Log)	1.580	1.198	0.060	5.334	16	8	953	
Linear Trend	(Inf Adj) (Log)	1.581	1.192	0.047	5.559	17	7	948	
Naïve*	(Log)	1.639	1.719	0.066	19.461	18	16	1005	
ARIMA	(IHS)	1.725	1.024	0.152	4.796	19	3	947	
ARIMA	(Log)	1.819	1.085	0.159	5.089	20	4	947	
NNAR	(IHS)	1.949	1.761	0.052	8.388	21	17	898	
NNAR	(Inf Adj) (IHS)	1.995	1.857	0.028	8.756	22	21	902	
NNAR	(Log)	2.032	1.826	0.076	8.533	23	20	897	
NNAR	(Inf Adj) (Log)	2.130	2.000	0.038	9.143	24	24	904	
Mean*	(Inf Adj) (IHS)	3.627	2.920	0.053	19.969	25	25	1005	
Mean*	(Inf Adj) (Log)	3.822	3.083	0.055	21.167	26	26	1005	
Mean*	(IHS)	5.463	3.103	0.209	22.338	27	27	1005	
Mean*	(Log)	5.758	3.281	0.222	23.681	28	28	1005	
ARIMA	(Inf Adj)	17.357	10.582	1.087	54.483	29	30	889	
Linear Trend	Sales Taxes	17.624	11.926	0.600	53.756	30	31	959	
Linear Trend	(Inf Adj)	17.839	12.582	0.778	56.897	31	32	961	
Drift*	Sales Taxes	18.518	31.170	0.525	486.516	32	41	1005	
DT ETS	Sales Taxes	18.746	16.171	0.735	74.847	33	33	920	
Drift*	(Inf Adj)	18.790	31.496	0.452	501.611	34	42	1005	
Naïve*	(Inf Adj)	18.955	28.781	0.753	470.734	35	39	1005	
DT ETS	(Inf Adj)	19.069	16.355	0.621	76.560	36	34	920	
Naïve*	Sales Taxes	19.776	27.437	1.018	449.304	37	38	1005	
ARIMA	Sales Taxes	19.948	10.184	1.071	52.954	38	29	880	
NNAR	Sales Taxes	23.160	19.200	0.702	91.820	39	35	892	
NNAR	(Inf Adj)	24.716	21.817	0.467	104.863	40	37	897	
Mean*	(Inf Adj)	34.224	28.988	1.092	643.986	41	40	1005	
Mean*	Sales Taxes	45.547	20.859	4.516	455.762	42	36	1005	