

Point Forecast Accuracy

Table 1: Wilcoxon rank sum test with continuity correction for Point Forecast accuracy comparing ARIMA with Baseline models

		sMAPE								MASE							
		Quarter (1)		Year (1-4)		Long (5-6)		Total (1-6)		Quarter (1)		Year (1-4)		Long (5-6)		Total (1-6)	
EBIT																	
	Naive	129,245	***	127,972	**	125,929	**	127,301	**	128,853	**	140,780	***	133,056	***	138,990	***
	Snaive	141,767	***	125,248	*	129,635	***	126,984	**	167,054	***	135,179	***	136,601	***	136,290	***
	Drift	129,169	***	128,069	**	124,758	*	126,928	**	128,686	**	140,958	***	134,017	***	138,666	***
	Holt	130,490	***	127,571	**	126,010	**	126,950	**	133,309	***	141,236	***	138,844	***	140,471	***
Net Income																	
	Naive	125,138	*	123,744	*	122,691	.	123,411	*	125,835	**	135,904	***	130,381	***	134,565	***
	Snaive	133,728	***	124,441	*	127,455	**	125,759	**	157,232	***	139,894	***	138,522	***	139,929	***
	Drift	125,108	*	123,807	*	121,185		122,784	*	126,154	**	135,842	***	130,306	***	133,883	***
	Holt	124,219	*	121,353	.	119,338		120,651		126,692	**	130,929	***	127,428	**	129,504	***
EPS																	
	Naive	124,835	*	123,349	*	121,704	.	122,775	*	125,556	*	135,665	***	129,331	***	134,118	***
	Snaive	133,251	***	123,532	*	125,881	**	124,583	*	157,781	***	136,362	***	135,354	***	136,507	***
	Drift	124,663	*	123,411	*	120,337		122,192	.	125,918	**	136,452	***	129,835	***	134,242	***
	Holt	124,463	*	122,308	.	121,245	.	121,931	.	128,124	**	134,334	***	131,988	***	133,489	***

Note: . p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 2: Wilcoxon rank sum test with continuity correction for Point Forecast accuracy comparing LSTM with Baseline models, ARIMA and Simple RNN

	sMAPE						MASE							
	Quarter (1)	Year (1-4)	Long (5-6)		Total (1-6)		Quarter (1)		Year (1-4)		Long (5-6)		Total (1-6)	
EBIT														
Naive	108,986	118,912	130,238	***	123,108	*	96,747		123,144	*	140,548	***	131,160	***
Snaive	119,865	115,428	134,686	***	122,752	.	130,110	***	113,303		144,505	***	126,994	**
Drift	109,183	119,325	128,737	**	122,929	*	96,684		123,307	*	141,404	***	130,662	***
Holt	109,180	118,492	130,094	***	122,893	*	99,980		122,561	.	146,142	***	132,432	***
ARIMA	93,268	106,054	119,276		110,873		77,288		93,873		123,969	*	105,797	
Simple	110,539	111,166	110,327		110,857		108,130		106,632		107,457		106,922	
Net Income														
Naive	111,879	117,009	125,577	*	120,108		101,822		119,597		133,057	***	125,623	*
Snaive	118,715	117,343	131,095	***	122,492	.	130,269	***	119,947		141,196	***	129,440	***
Drift	111,990	117,315	123,596	*	119,622		102,282		119,512		132,911	***	124,703	*
Holt	109,918	114,353	121,585	.	117,074		100,831		113,615		130,282	***	120,392	
ARIMA	101,230	108,913	117,783		112,091		87,527		95,980		118,692		105,127	
Simple	112,678	112,227	112,223		112,243		111,157		107,313		109,512		107,886	
EPS														
Naive	110,423	117,361	126,132	**	120,538		99,137		121,666	.	136,781	***	128,416	**
Snaive	117,396	117,327	130,880	***	122,504	.	127,446	**	118,892		143,356	***	129,344	***
Drift	110,283	117,578	124,272	*	120,063		99,545		122,465	.	137,476	***	128,552	**
Holt	109,586	116,244	125,574	*	119,724		100,135		119,553		139,407	***	127,676	**
ARIMA	100,045	109,542	119,541		113,205		84,621		98,698		123,753	*	108,739	
Simple	112,321	112,713	112,793		112,774		109,694		108,330		110,841		109,363	

Note: . p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 3: Wilcoxon rank sum test with continuity correction for Point Forecast accuracy comparing GRU with Baseline models, ARIMA and Simple RNN

	sMAPE							MASE							
	Quarter (1)	Year (1-4)	Long (5-6)		Total (1-6)			Quarter (1)		Year (1-4)		Long (5-6)		Total (1-6)	
EBIT															
Naive	109,993	120,439	133,915	***	125,465	*		98,424		127,212	**	147,090	***	136,441	***
Snaive	120,911	117,184	138,028	***	124,964	*		133,381	***	118,673		152,472	***	133,816	***
Drift	110,160	120,829	132,241	***	125,100	*		98,537		127,371	**	148,312	***	135,843	***
Holt	110,289	120,103	133,644	***	125,053	*		101,940		126,836	**	153,065	***	137,884	***
ARIMA	94,549	107,792	122,941	*	113,351			79,698		98,399		131,372	***	111,949	
Simple	111,827	112,902	114,475		113,532			111,255		111,859		114,656		113,228	
Net Income															
Naive	112,778	118,951	128,331	**	122,340	.		103,660		125,408	*	139,286	***	131,810	***
Snaive	120,073	119,613	133,820	***	124,990	*		133,383	***	127,628	**	147,917	***	137,274	***
Drift	112,817	119,148	126,192	**	121,794	.		104,073		125,139	*	139,476	***	130,998	***
Holt	110,962	116,479	124,405	*	119,404			102,752		119,844		136,461	***	126,624	**
ARIMA	102,320	111,002	120,532		114,445			89,792		102,863		125,767	**	112,415	
Simple	113,891	114,376	115,361		114,675			113,628		114,449		116,138		115,092	
EPS															
Naive	112,507	119,274	128,938	**	122,715	.		103,687		126,507	**	142,632	***	133,944	***
Snaive	119,508	119,387	133,448	***	124,716	*		132,883	***	125,468	*	150,204	***	136,430	***
Drift	112,331	119,414	127,057	**	122,159	.		103,987		127,424	**	143,472	***	134,065	***
Holt	111,767	118,232	128,229	**	121,945	.		105,322		124,697	*	145,341	***	133,065	***
ARIMA	102,345	111,521	122,457	.	115,542			90,323		104,864		130,423	***	115,389	
Simple	114,447	114,944	115,903		115,244			115,528		114,488		117,278		116,005	

Note: . p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001

Prediction Interval Accuracy

Table 4: Wilcoxon rank sum test with continuity correction for accuracy measured by sMIS comparing ARIMA with Baseline models

	Quarter (1)		Year (1-4)		Long (5-6)		Total (1-6)	
EBIT								
Drift	176,710	***	206,658	***	217,663	***	212,365	***
Holt	157,006	***	162,914	***	147,822	***	160,367	***
Naive	175,326	***	203,442	***	213,217	***	208,367	***
Snaive	210,983	***	196,151	***	195,101	***	197,746	***
Net Income								
Drift	181,652	***	215,021	***	225,684	***	220,967	***
Holt	150,350	***	148,527	***	124,577	*	141,110	***
Naive	180,799	***	212,489	***	223,245	***	218,194	***
Snaive	212,394	***	203,105	***	210,214	***	207,869	***
EPS								
Drift	182,398	***	215,286	***	225,127	***	220,754	***
Holt	153,328	***	160,312	***	148,301	***	159,040	***
Naive	181,083	***	212,916	***	222,725	***	218,146	***
Snaive	213,395	***	203,845	***	210,104	***	208,270	***
<i>Note: . p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001</i>								

H3: LSTM vs. GRU

Table 5: Wilcoxon rank sum test with continuity correction for accuracy measured by sMIS comparing LSTM with Baseline models, ARIMA and Simple RNN

	Quarter (1)			Year (1-4)			Long (5-6)			Total (1-6)		
EBIT												
ARIMA	168,435	***		191,359	***		212,607	***		201,410	***	
Drift	200,281	***		221,854	***		229,164	***		225,881	***	
Holt	190,015	***		207,219	***		218,797	***		213,167	***	
Naive	199,342	***		220,645	***		228,370	***		224,703	***	
Simple	173,510	***		172,041	***		168,206	***		170,744	***	
Snaive	216,317	***		217,435	***		226,273	***		221,824	***	
Net Income												
ARIMA	193,316	***		206,589	***		216,529	***		211,536	***	
Drift	214,534	***		227,330	***		230,244	***		229,025	***	
Holt	205,772	***		213,976	***		217,493	***		216,034	***	
Naive	214,166	***		226,765	***		229,904	***		228,520	***	
Simple	178,483	***		175,477	***		172,670	***		174,554	***	
Snaive	223,847	***		225,099	***		228,498	***		227,033	***	
EPS												
ARIMA	194,412	***		208,423	***		218,089	***		213,426	***	
Drift	215,423	***		227,879	***		230,685	***		229,529	***	
Holt	207,367	***		218,116	***		222,685	***		220,924	***	
Naive	214,925	***		227,357	***		230,390	***		229,024	***	
Simple	178,359	***		176,464	***		173,569	***		175,479	***	
Snaive	224,714	***		225,799	***		229,607	***		227,756	***	

Note: . p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 6: Wilcoxon rank sum test with continuity correction for accuracy measured by sMIS comparing GRU with Baseline models, ARIMA and Simple RNN

	Quarter (1)			Year (1-4)		Long (5-6)		Total (1-6)	
EBIT									
ARIMA	156,057	***	178,300	***	202,502	***	189,441	***	
Drift	193,053	***	218,088	***	227,697	***	223,248	***	
Holt	180,778	***	197,801	***	210,731	***	204,158	***	
Naive	192,144	***	216,596	***	226,470	***	221,618	***	
Simple	162,269	***	159,221	***	155,008	***	157,664	***	
Snaive	210,742	***	210,031	***	221,208	***	215,424	***	
Net Income									
ARIMA	183,279	***	196,953	***	207,820	***	202,288	***	
Drift	209,510	***	225,739	***	229,682	***	227,994	***	
Holt	197,983	***	206,684	***	209,433	***	208,469	***	
Naive	209,040	***	224,979	***	229,141	***	227,254	***	
Simple	167,733	***	164,274	***	158,983	***	162,450	***	
Snaive	220,810	***	221,913	***	226,557	***	224,524	***	
EPS									
ARIMA	182,945	***	197,539	***	208,569	***	202,731	***	
Drift	209,917	***	226,052	***	230,093	***	228,372	***	
Holt	198,599	***	210,264	***	215,618	***	213,271	***	
Naive	209,299	***	225,255	***	229,631	***	227,647	***	
Simple	165,817	***	163,604	***	158,918	***	161,870	***	
Snaive	221,399	***	221,946	***	227,276	***	224,805	***	

Note: . p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 7: Wilcoxon rank sum test with continuity correction for accuracy comparing LSTM and GRU

	sMAPE	MASE	sMIS	
EBIT				
Q1	116,778	118,555	103,675	**
Q1 - Q4	117,289	121,121	102,986	**
Q5 - Q6	119,974	123,242	102,531	**
Total	118,224	122,380	102,689	**
Net Income				
Q1	116,835	118,360	101,444	***
Q1 - Q4	117,786	123,073	102,398	**
Q5 - Q6	118,827	122,568	100,149	***
Total	118,230	123,219	101,459	***
EPS				
Q1	117,785	121,410	101,180	***
Q1 - Q4	117,761	121,861	100,754	***
Q5 - Q6	118,896	122,096	99,070	***
Total	118,115	122,247	100,074	***

Note: . p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001