

Table 1. Series characteristics for the Norwegian Thinly Traded Equity Market.

Individual Series	Obs / Prop.	Yearly Mean	Yearly std.dev.	Max. Min.	Kurtosis Skew	K-S Z-stat	ARCH (6)	RESET (12;6)	BDS m=2	($\varepsilon = 1$) m=3	m=4
1. VP-1	2611 1.00	15.196	32.417	13.04 -20.27	8.4051 -0.3109	3.062 {0.004}	288.41 {0.000}	43.4515 {0.000}	1.920 {0.063}	2.837 {0.007}	3.251 {0.002}
2. VP-2	2611 1.00	25.140	33.153	13.44 -23.43	9.1629 -0.3739	3.148 {0.003}	70.922 {0.000}	42.199 {0.000}	2.531 {0.016}	2.000 {0.054}	1.598 {0.111}
3. VP-3	2611 0.97	8.598	46.407	26.76 -46.98	30.219 -1.3141	3.456 {0.001}	254.31 {0.000}	37.37 {0.000}	3.479 {0.001}	3.337 {0.002}	2.900 {0.006}
4. VP-4	2369 0.90	-10.479	116.66	32.26 -45.84	3.9290 -0.1425	3.483 {0.001}	246.17 {0.000}	35.22 {0.000}	7.048 {0.000}	5.563 {0.000}	4.477 {0.000}
5. VP-5	2577 0.83	12.645	57.56	24.41 -33.69	11.8919 -0.6232	5.236 {0.000}	276.42 {0.000}	73.33 {0.000}	9.391 {0.000}	10.152 {0.000}	10.350 {0.000}
6.VP-6	2515 0.57	42.318	130.70	81.20 -167.9	95.667 -3.9843	8.399 {0.000}	203.57 {0.000}	79.69 {0.000}	15.533 {0.000}	18.822 {0.000}	21.057 {0.000}
7.VP-7	2499 0.43	34.618	108.42	53.59 -56.57	17.440 -0.5615	8.915 {0.000}	291.73 {0.000}	38.45 {0.000}	20.608 {0.000}	23.900 {0.000}	30.789 {0.000}
8.VP-TT	2611 0.91	21.456	32.553	10.80 -15.91	5.7203 -0.1158	2.574 {0.015}	89.350 {0.000}	25.727 {0.012}	7.472 {0.000}	8.143 {0.000}	8.819 {0.000}
9.VP-FT	2611 1.00	5.502	25.127	13.32 -23.06	26.146 -1.3147	3.809 {0.000}	390.988 {0.000}	74.951 {0.000}	16.194 {0.000}	19.102 {0.000}	21.166 {0.000}
10.VP-EW	2611 1.00	7.676	17.610	11.42 -16.66	29.844 -1.5458	4.580 {0.000}	630.085 {0.000}	76.919 {0.000}	13.294 {0.000}	14.757 {0.000}	15.850 {0.000}
11.VP-VW	2611 1.00	13.278	20.581	10.48 -21.22	36.143 -2.0040	3.800 {0.000}	288.878 {0.000}	68.810 {0.000}	12.653 {0.000}	14.908 {0.000}	15.746 {0.000}

VP1, VP-2,...,VP-7 are individual assets sorted in ascending order of trading volume. VP-TT is the portfolio containing the most thinly traded and VP-FT contains the most frequently traded assets. VP-EW and VP-VW are an equal-weighted and a value-weighted index for the Norwegian market.

Yearly mean is daily mean multiplied by 252 trading days and yearly standard deviation is daily standard deviation multiplied by the square root of 252 trading days. Skew is a measure of heavy tails and asymmetry of a distribution (normal) and kurtosis is measure of too many observations around the mean for a distribution (normal). K-S Z-test: Used to test the hypothesis that a sample comes from a normal distribution. The value of the Kolmogorov-Smirnov Z-test is based on the largest absolute difference between the observed and the theoretical cumulative distributions. ARCH (6) : ARCH (6) is a test for conditional heteroscedasticity in returns. Low {.} indicates significant values. We employ the OLS-regression $y^2 = a_0 + a_1 \cdot y_{t-1}^2 + \dots + a_6 \cdot y_{t-6}^2$. $T \cdot R^2$ is χ^2 distributed with 6 degrees of freedom. T is the number of observations, y is returns and R^2 is the explained over total variation. $a_0, a_1 \dots a_6$ are parameters.

RESET (12,6) : A sensitivity test for mainly linearity in the mean equation. 12 is number of lags and 6 is the number of moments that is chosen in our implementation of the test statistic. $T \cdot R^2$ is χ^2 distributed with 12 degrees of freedom.

BDS ($m=2, \varepsilon=1$): A test statistic for general non-linearity in a time series. The test statistic $BDS = T^{1/2} \cdot [C_m(\sigma \varepsilon) - C_1(\sigma \varepsilon)^m]$, where C is based on the correlation-integral, m is the dimension and ε is the number of standard deviations. Under the null hypothesis of identically and independently distributed (i.i.d.) series, the BDS-test statistic is asymptotic normally distributed with a zero mean and with a known but complicated variance.

Table 2. Test statistic for ARMA and GARCH specifications with normal residuals.

Series:	Residual:	Test statistics:			BDS test statistic: ($\varepsilon = 1.0$)							
		ARCH	$\chi^2(6)$	RESET	$\chi^2(12)$	m = 2	m = 3	m = 4	m = 5	m = 6	m = 7	m = 8
1. VP-1	ν	369.21	{0.000}	42.971	{0.000}	8.5510	10.0162	11.2498	11.6067	12.6495	13.8086	14.9050
	ω	202.67	{0.000}	40.991	{0.000}	9.6084	10.8099	11.5134	11.7112	12.2171	12.7911	13.4521
	$\text{Ln}(\xi^c)$	6.7902	{0.341}	11.325	{0.501}	-0.8803	-0.3265	0.1130	0.2632	0.4571	1.0048	1.9318
	$\text{Ln}(\pi^c)$	6.5125	{0.368}	11.506	{0.486}	-0.6208	-0.2309	0.0852	0.3161	0.6184	1.3509	2.2648
2. VP-2	ν	99.744	{0.000}	40.444	{0.000}	7.6281	8.9439	9.4337	9.4346	10.1117	10.8621	11.8171
	ω	35.168	{0.000}	35.012	{0.000}	7.7776	9.0362	9.2817	9.5616	10.0224	10.4880	10.8626
	$\text{Ln}(\xi^c)$	2.7913	{0.835}	14.770	{0.254}	-0.0463	-0.2422	-0.1760	0.1640	0.7018	0.3484	0.3665
	$\text{Ln}(\pi^c)$	3.1260	{0.793}	14.159	{0.291}	0.2564	0.2813	0.2522	0.3815	0.7625	0.3229	0.6639
3. VP-3	ν	257.41	{0.000}	37.412	{0.000}	11.9842	13.2841	14.3353	16.9892	20.4752	25.2495	27.6834
	ω	8.0755	{0.233}	20.372	{0.060}	11.5542	12.5671	12.5220	13.0422	13.7803	14.3479	14.7436
	$\text{Ln}(\xi^c)$	2.3429	{0.886}	15.586	{0.211}	0.5611	0.2160	0.2681	0.7090	0.4295	0.1837	-1.1281
	$\text{Ln}(\pi^c)$	2.3445	{0.885}	15.105	{0.236}	0.5535	0.1894	0.2004	0.5679	0.6592	0.7832	0.4842
4. VP-4	ν	175.39	{0.000}	32.861	{0.001}	13.6738	17.4681	22.1961	25.2432	34.4052	18.1240	-5.3455
	ω	154.54	{0.000}	30.727	{0.002}	15.1138	17.3960	18.8071	20.3668	22.4793	25.0904	28.0774
	$\text{Ln}(\xi^c)$	7.8973	{0.246}	12.235	{0.427}	1.8822	1.4112	0.8538	0.5931	0.4380	-0.8034	-1.2040
	$\text{Ln}(\pi^c)$	9.2157	{0.162}	10.911	{0.537}	1.9673	1.5942	1.1864	1.2834	1.1320	0.9604	0.6299
5. VP-5	ν	207.98	{0.000}	67.390	{0.000}	11.6209	14.7820	17.8220	20.3445	22.2221	25.0255	31.9776
	ω	209.28	{0.000}	67.412	{0.000}	13.0195	15.2500	16.9169	18.3810	19.8070	21.4047	23.3438
	$\text{Ln}(\xi^c)$	2.4115	{0.878}	10.001	{0.616}	4.5311	5.2427	4.8054	5.0089	4.7085	3.7040	4.7137
	$\text{Ln}(\pi^c)$	2.3139	{0.889}	10.204	{0.598}	4.7305	5.4736	5.0423	5.3908	4.5261	2.7400	3.9282
6. VP-6	ν	95.119	{0.000}	86.328	{0.000}	21.0558	27.9705	38.2024	59.7633	103.030	217.044	476.155
	ω	93.586	{0.000}	85.963	{0.000}	16.6573	18.0466	19.3285	20.0234	20.7093	21.4976	22.5865
	$\text{Ln}(\xi^c)$	4.4821	{0.612}	15.816	{0.200}	9.5848	8.3431	8.3270	8.2894	8.4489	6.9131	6.2213
	$\text{Ln}(\pi^c)$	5.5198	{0.479}	16.547	{0.167}	9.3262	8.3420	8.1306	8.2592	8.9126	7.3368	8.4389
7. VP-7	ν	176.33	{0.000}	53.377	{0.000}	36.0967	55.2813	87.9003	148.915	277.593	557.858	1194.73
	ω	176.75	{0.000}	51.736	{0.000}	15.6134	15.9042	16.0970	16.9001	17.7405	18.6658	19.7833
	$\text{Ln}(\xi^c)$	7.7186	{0.259}	10.086	{0.608}	29.3216	27.2604	28.4112	31.2741	47.2066	79.3681	166.350
	$\text{Ln}(\pi^c)$	8.2269	{0.222}	9.8907	{0.626}	29.2591	27.6074	28.4628	32.6828	48.3300	81.0214	168.112
8. VP-TT	ν	57.7683	{0.000}	25.231	{0.014}	6.1891	6.8691	7.2851	7.9796	8.3611	9.4105	10.3236
	ω	58.057	{0.000}	24.544	{0.017}	6.3154	7.3980	8.1286	8.5379	8.6721	9.0331	9.3971
	$\text{Ln}(\xi^c)$	13.230	{0.040}	11.598	{0.478}	-2.0211	-2.3023	-2.2785	-2.0012	-1.1215	-0.7245	0.3702
	$\text{Ln}(\pi^c)$	13.606	{0.034}	10.408	{0.580}	-2.3309	-2.6923	-2.4845	-2.1558	-1.3843	-1.3634	-1.1203
9. VP-FT	ν	696.829	{0.000}	77.613	{0.000}	14.1415	16.8083	18.7161	20.6489	23.2936	26.1429	29.4136
	ω	107.228	{0.000}	61.943	{0.000}	14.8847	17.0585	18.4922	19.7159	21.1360	22.7302	24.5316
	$\text{Ln}(\xi^c)$	9.36171	{0.154}	8.9307	{0.709}	0.3242	0.3054	0.3079	0.3670	0.5047	0.4547	0.4390
	$\text{Ln}(\pi^c)$	10.657	{0.100}	7.14585	{0.848}	-1.4945	-1.2455	-1.8494	-1.7013	-1.7168	-2.0197	-1.7640
10. VP-EW	ν	882.376	{0.000}	77.718	{0.000}	11.4712	13.1767	14.3758	15.5042	16.7248	17.9349	19.1912
	ω	91.195	{0.000}	48.696	{0.000}	11.8183	13.2399	14.3738	15.3158	16.4717	17.6254	18.7489
	$\text{Ln}(\xi^c)$	6.2967	{0.391}	9.6714	{0.645}	1.0641	1.1486	1.7411	1.9639	2.1802	2.2108	3.0017
	$\text{Ln}(\pi^c)$	5.93344	{0.431}	9.8308	{0.631}	1.7199	1.7958	1.9718	1.9218	1.9135	2.3255	3.2857
11. VP-VW	ν	589.024	{0.000}	71.628	{0.000}	10.1122	12.4968	13.3401	13.9719	15.3633	16.6591	18.1129
	ω	64.0411	{0.000}	51.184	{0.000}	10.5922	13.1446	14.0522	14.7188	15.9064	16.9993	18.3095
	$\text{Ln}(\xi^c)$	8.73444	{0.189}	10.459	{0.576}	0.2326	0.1819	0.1300	0.0982	0.0710	0.1606	0.3480
	$\text{Ln}(\pi^c)$	14.8494	{0.021}	11.498	{0.487}	-0.9033	-1.6247	-2.3502	-2.3511	-2.2995	-2.4163	-2.1255

Table 3. Test statistics for ARMA and GARCH specifications. Student-t density residuals.
(estimated degrees of freedom in parantheses in first column for GARCH models)

Series:	Residual:	Test statistics:				BDS test statistic: ($\varepsilon = 1.0$)						
		ARCH	$\chi^2(6)$	RESET	$\chi^2(12)$	m = 2	m = 3	m = 4	m = 5	m = 6	m = 7	m = 8
1. VP-1	ν	369.21	{0.000}	42.971	{0.000}	8.5510	10.0162	11.2498	11.6067	12.6495	13.8086	14.9050
	ω	202.67	{0.000}	40.991	{0.000}	9.6084	10.8099	11.5134	11.7112	12.2171	12.7911	13.4521
	($\eta = 5.051181$) $\text{Ln}(\xi^c)$	7.8557	{0.249}	11.653	{0.474}	-0.8482	-0.2557	0.0178	0.4446	0.3850	0.9010	1.9451
	($\eta = 5.036366$) $\text{Ln}(\pi^c)$	7.0335	{0.318}	12.180	{0.431}	-0.4919	-0.1447	0.1211	0.5505	0.4599	0.8103	1.6872
2. VP-2	ν	99.744	{0.000}	40.444	{0.000}	7.6281	8.9439	9.4337	9.4346	10.1117	10.8621	11.8171
	ω	35.168	{0.000}	35.012	{0.000}	7.7776	9.0362	9.2817	9.5616	10.0224	10.4880	10.8626
	($\eta = 4.533413$) $\text{Ln}(\xi^c)$	3.3378	{0.765}	13.246	{0.351}	0.3143	-0.1800	-0.0981	0.2406	0.4830	0.0122	0.2088
	($\eta = 4.440638$) $\text{Ln}(\pi^c)$	2.8655	{0.826}	12.374	{0.416}	0.5983	0.1708	0.2327	0.2951	0.6470	0.6555	-0.4521
3. VP-3	ν	257.41	{0.000}	37.412	{0.000}	11.9842	13.2841	14.3353	16.9892	20.4752	25.2495	27.6834
	ω	8.0755	{0.233}	20.372	{0.060}	11.5542	12.5671	12.5220	13.0422	13.7803	14.3479	14.7436
	($\eta = 4.382588$) $\text{Ln}(\xi^c)$	3.5333	{0.740}	14.924	{0.246}	0.6305	0.2356	0.1635	0.5328	0.4559	0.0871	-0.3496
	($\eta = 4.362314$) $\text{Ln}(\pi^c)$	3.6470	{0.724}	14.362	{0.278}	0.8214	0.5941	0.5372	0.7771	0.8743	0.3831	0.0398
4. VP-4	ν	175.39	{0.000}	32.861	{0.001}	13.6738	17.4681	22.1961	25.2432	34.4052	18.1240	-5.3455
	ω	154.54	{0.000}	30.727	{0.002}	15.1138	17.3960	18.8071	20.3668	22.4793	25.0904	28.0774
	($\eta = 4.20412$) $\text{Ln}(\xi^c)$	7.0298	{0.318}	11.282	{0.505}	1.4770	1.1442	0.7963	0.7493	1.0373	0.5344	1.0387
	($\eta = 4.158861$) $\text{Ln}(\pi^c)$	7.3253	{0.292}	10.043	{0.612}	1.4922	1.2922	1.0109	1.0110	1.2431	1.8013	3.4529
5. VP-5	ν	207.98	{0.000}	67.390	{0.000}	11.6209	14.7820	17.8220	20.3445	22.2221	25.0255	31.9776
	ω	209.28	{0.000}	67.412	{0.000}	13.0195	15.2500	16.9169	18.3810	19.8070	21.4047	23.3438
	($\eta = 3.29325$) $\text{Ln}(\xi^c)$	2.2157	{0.899}	12.346	{0.418}	3.5223	4.1219	4.0231	3.4512	2.5847	1.4104	0.6104
	($\eta = 3.295526$) $\text{Ln}(\pi^c)$	2.0568	{0.914}	12.365	{0.417}	3.4622	4.1440	4.0970	3.6637	2.9759	2.6206	2.2552
6. VP-6	ν	95.119	{0.000}	86.328	{0.000}	21.0558	27.9705	38.2024	59.7633	103.030	217.044	476.155
	ω	93.586	{0.000}	85.963	{0.000}	16.6573	18.0466	19.3285	20.0234	20.7093	21.4976	22.5865
	($\eta = 2.622771$) $\text{Ln}(\xi^c)$	0.2495	{1.000}	6.7053	{0.876}	5.0168	5.5153	5.3258	7.0001	8.4744	8.5042	16.9384
	($\eta = 2.629503$) $\text{Ln}(\pi^c)$	0.2509	{1.000}	6.5082	{0.888}	4.6847	5.3236	5.0033	6.3201	7.8735	8.4026	16.2952
7. VP-7	ν	176.33	{0.000}	53.377	{0.000}	36.0967	55.2813	87.9003	148.915	277.593	557.858	1194.73
	ω	176.75	{0.000}	51.736	{0.000}	15.6134	15.9042	16.0970	16.9001	17.7405	18.6658	19.7833
	($\eta = 2.364853$) $\text{Ln}(\xi^c)$	14.657	{0.023}	14.943	{0.245}	9.4015	11.5595	17.2619	29.0393	55.2045	110.367	251.309
	($\eta = 2.362968$) $\text{Ln}(\pi^c)$	13.712	{0.033}	14.515	{0.269}	11.0482	13.6064	19.2758	32.1468	61.5073	126.285	290.464
8. VP-TT	ν	61.229	{0.000}	25.000	{0.015}	6.1891	6.8691	7.2851	7.9796	8.3611	9.4105	10.3236
	ω	61.159	{0.000}	24.649	{0.017}	6.3154	7.3980	8.1286	8.5379	8.6721	9.0331	9.3971
	($\eta = 6.21166$) $\text{Ln}(\xi^c)$	15.113	{0.040}	11.858	{0.957}	-1.8410	-2.2261	-2.0752	-2.0572	-1.6335	0.0708	0.4348
	($\eta = 6.256039$) $\text{Ln}(\pi^c)$	15.367	{0.018}	10.841	{0.543}	-2.1215	-2.4885	-2.2916	-1.9996	-1.9722	-0.3804	0.0747
9. VP-FT	ν	888.06	{0.000}	79.968	{0.000}	14.1415	16.8083	18.7161	20.6489	23.2936	26.1429	29.4136
	ω	69.865	{0.000}	67.177	{0.000}	14.8847	17.0585	18.4922	19.7159	21.1360	22.7302	24.5316
	($\eta = 6.220762$) $\text{Ln}(\xi^c)$	11.875	{0.065}	9.1982	{0.686}	-1.6278	-1.4376	-1.8309	-1.9083	-1.6891	-1.7654	-1.8384
	($\eta = 6.268164$) $\text{Ln}(\pi^c)$	18.120	{0.006}	9.0229	{0.701}	-1.2198	-1.0094	-1.7295	-1.7802	-1.8112	-1.9254	-1.6756
10. VP-EW	ν	1090.7	{0.000}	81.075	{0.000}	11.4712	13.1767	14.3758	15.5042	16.7248	17.9349	19.1912
	ω	838.42	{0.000}	97.718	{0.000}	11.8183	13.2399	14.3738	15.3158	16.4717	17.6254	18.7489
	($\eta = 5.020918$) $\text{Ln}(\xi^c)$	12.151	{0.059}	8.0514	{0.781}	1.7452	2.0208	2.5350	2.5926	2.6177	3.1507	3.5963
	($\eta = 5.110305$) $\text{Ln}(\pi^c)$	11.517	{0.074}	10.847	{0.542}	1.7738	2.0061	2.2870	2.5049	2.7409	2.8546	3.6363
11. VP-VW	ν	751.92	{0.000}	74.180	{0.000}	10.1122	12.4968	13.3401	13.9719	15.3633	16.6591	18.1129
	ω	50.531	{0.000}	51.687	{0.000}	10.5922	13.1446	14.0522	14.7188	15.9064	16.9993	18.3095
	($\eta = 6.512626$) $\text{Ln}(\xi^c)$	14.127	{0.028}	10.459	{0.576}	-0.5066	-1.4408	-1.8923	-1.8700	-1.9201	-1.7037	-1.6792
	($\eta = 6.542097$) $\text{Ln}(\pi^c)$	30.107	{0.000}	12.038	{0.443}	-0.4234	-1.4330	-1.8904	-1.4782	-1.2253	-1.0075	-0.6089