Table 1. Portfolio characteristics for the Norwegian Equity Market

	Trading volume series:				Market Index series:	
	R_1	R_2	R_3	R_4	R_{EM}	R_{VM}
Daily mean:	0.08514	0.02872	0.01351	0.02183	0.03046	0.05269
Yearly mean:	21.4565	7.23848	3.40539	5.50204	7.67598	13.2784
Daily st.dev.	2.05062	1.36740	1.38880	1.58280	1.10930	1.29650
Yearly st.dev.	32.5525	21.7063	22.0466	25.1267	17.6101	20.5812
Max Return	10.8004	10.3330	11.5550	13.3180	11.4230	10.4810
Min Return	-15.9060	-14.5250	-16.1890	-23.0630	-16.6640	-21.2190
Skewness	-0.11584	-0.60257	-0.98671	-1.31470	-1.54580	-2.00398
Kurtosis	5.7203	11.1800	14.8691	26.1456	29.8444	36.1425
K-S Z-test	15.4010	13.8466	11.7075	14.2467	12.5083	10.5244
ARCH (6)	109.368	318.469	779.638	526.529	818.958	550.225
RESET(12;6)	25.7275	54.0216	80.0946	74.9514	76.9191	68.8097
BDS(m=2;ε=1)	7.47176	8.37882	13.1261	16.1939	12.8661	12.6531
BDS(m=3;ε=1)	8.14346	10.5286	15.3908	19.1019	15.1892	14.9082

R_1 is the portfolio containing the most thinly traded, R_2 contains the intermediate thinly traded assets, R_3 contains the intermediate frequently traded assets and R_4 contains the most frequently traded assets. 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 $y^2 = a_0 + a_1 . y^2_{t-1} + \ldots + a_6 . y^2_{t-6}$. $T \cdot R^2$ is $\square^2$ distributed with 6 degrees of freedom. T is the number of observations, *y* is returns and R^2 is the explained over total variation. $a_0, a_1 \ldots a_6$ 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,ε=1): A test statistic for general non-linearity in a time series. The test statistic BDS $= T^{1/2}.[C_m(\sigma \cdot \varepsilon) - C_1(\sigma \cdot \varepsilon)^m]$, 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. Summary statistic for adjusted daily returns

Series*	$\mu_i(x)$	$\sigma_i(x)$	$\rho_i(1)$	$\rho_i(2)$	$\rho_i(3)$	$\rho_i(4)$	$\rho_i(5)$	$\rho_i(6)$	$Q_i(6)$
R_1	0.0851	2.0506	-0.185	-0.060	-0.029	0.030	0.006	0.012	103.752
R_2	0.0287	1.3674	-0.041	0.025	-0.051	0.024	-0.013	0.016	15.6070
R_3	0.0135	1.3888	0.178	-0.015	-0.064	-0.010	0.013	0.014	95.6570
R_4	0.0218	1.5828	0.129	-0.066	-0.073	-0.011	0.013	0.019	70.6710
R_{EM}	0.0305	1.1093	0.096	0.013	-0.030	0.016	0.010	0.031	30.4060
R_{VM}	0.0527	1.2965	0.140	-0.046	-0.053	-0.013	0.009	0.028	67.0390
R_1^2	4.2123	10.8679	0.142	0.094	0.056	0.098	0.018	0.044	115.374
R_2^2	1.8705	9.6138	0.460	0.074	0.026	0.039	0.042	0.069	589.449
R_3^2	1.9290	7.3750	0.485	0.188	0.083	0.062	0.106	0.110	796.782
R_4^2	2.5058	12.6401	0.375	0.074	0.044	0.047	0.033	0.056	403.173
R_{EM}^2	1.2315	8.0628	0.460	0.079	0.030	0.042	0.033	0.056	587.832
R_{VM}^2	1.6837	9.9076	0.320	0.048	0.032	0.053	0.023	0.056	292.262

* See Table 1 for a description of series and test statistics.
We report returns (μ_i), volatility (σ_i) and autocorrelation (ρ_i) and *Q(6)* is the Ljung-Box (1978) joint test statistic for serial correlation at the first moment up to lag 6.

Table 3. Optimized Likelihood and Model sececction BIC Criteria.

	p	q	s_n	BIC	HQ	AIC	Likelihood
Thinly	1	0	10630.916	11083.495	11080.561	11077.627	-5537.814
traded	0	1	10558.596	11065.672	11062.739	11059.805	-5528.902
Portfolio	1	1	10519.141	11063.765	11057.898	11052.030	-5524.015
(R_1)	0	2	10515.080	11062.757	11056.890	11051.022	-5523.511 *
Intermediate							
Thinly	1	0	4875.757	9048.244	9045.310	9042.376	-4520.188
traded	0	1	4876.109	9048.182	9045.249	9042.315	-4520.282 *
Portfolio (R_2)	1	1	4865.670	9050.705	9044.837	9038.970	-4517.485
Intermediate							
Frequently	1	0	4876.061	9048.407	9045.473	9042.539	-4520.270
traded	0	1	4869.402	9044.838	9041.905	9038.971	-4518.486 *
Portfolio (R_3)	1	1	4869.239	9052.619	9046.752	9040.884	-4518.442
Frequently	1	0	6433.942	9772.306	9769.372	9766.438	-4882.219
traded	0	1	6417.588	9765.660	9762.727	9759.793	-4878.896 *
Portfolio (R_4)	1	1	6410.248	9770.541	2446.569	-4877.403	-4877.403
Equal Weighted	1	0	3185.294	7936.661	7933.727	7930.793	-3964.397 *
Market	0	1	3185.995	7937.236	7934.302	7931.368	-3964.684
Index (R_{EM})	1	1	3185.262	7944.503	7938.635	7932.768	-3964.384
Value Weighted	1	0	4307.636	8724.777	8721.843	8718.910	-4358.455
Market	0	1	4298.363	8719.151	8716.217	8713.283	-4355.642 *
Index (R_{VM})	1	1	4295.928	8725.539	8719.672	8713.804	-4354.902

* BIC preferred model.

Table 4. ARMA (p,q) coefficients for six return series.

We estimate the model $R_{i,t} = \alpha_i + \phi_i R_{i,t-1} + \theta_{i,1} \cdot \varepsilon_{i,t-1} + \theta_{i,2} \cdot \varepsilon_{i,t-2} + \varepsilon_{i,t}$, where *i* is four asset series and two index series. R_{it} is the return series. α_i is a constant parameter, ϕ_i is the auto-regressive parameter and $\theta_{i,1}$ and $\theta_{i,2}$ is the moving average parameters. ε_i is model residuals.

Series*	Log-Likelihood	*ARMA(p,q)* ϕ_i	$\theta_{i,1}$	$\theta_{i,2}$
R_1	-5295.41	---	0.21640	0.05142
		---	{10.767}	{2.625}
R_2	-4004.53	---	0.13516	---
		---	{5.723}	---
R_3	-4000.65	---	-0.06211	---
		---	-{2.250}	---
R_4	-4325.09	---	-0.25168	---
		---	-{9.337}	---
R_{EM}	-3347.27	0.17198	---	---
		{8.340}	---	---
R_{VM}	-3842.35	---	-0.24194	---
		---	-{11.459}	---

* See Table 1 for a definition of the series

Table 5. Summary characteristics from an ARMA (p,q) specification

	$\rho_i(1)$	$\rho_i(2)$	$\rho_i(3)$	$\rho_i(4)$	$\rho_i(5)$	$\rho_i(6)$	Qi(6) / $Q^2(6)$	$\mu_i(x)$ / $\sigma_i(x)$	$Kurtosis_i$ / $Skew_i$	ARCH* (6)	RESET* (12;6)
ε_1	0.001	-0.001	-0.022	0.032	0.020	0.031	7.5320	0	4.3688	57.7784	25.2299
							{0.2740}	2.0034	-0.0629	{0.0000}	{0.0138}
ε_2	-0.001	0.023	-0.049	0.022	-0.011	0.019	10.3030	0	24.942	549.255	54.2867
							{0.1120}	1.3662	-1.4041	{0.0000}	{0.0000}
ε_3	0.001	-0.004	-0.063	-0.001	0.013	0.000	10.8510	0	13.798	846.041	81.7624
							{0.0930}	1.3656	-1.1187	{0.0000}	{0.0000}
ε_4	-0.007	-0.056	-0.065	-0.003	0.013	0.007	19.8410	0	24.449	696.325	77.6147
							{0.0030}	1.5677	-0.7689	{0.0000}	{0.0000}
ε_{EM}	0.000	0.007	-0.034	0.018	0.005	0.019	4.8890	0	42.073	882.221	77.7210
							{0.5580}	1.1042	-1.3783	{0.0000}	{0.0000}
ε_{VM}	-0.005	-0.038	-0.046	-0.007	0.009	0.011	10.0350	0	32.205	588.766	71.6336
							{0.1230}	1.2822	-1.3448	{0.0000}	{0.0000}
ε_1^2	0.101	0.088	0.058	0.072	0.022	0.043	75.5630	4.0136	167.788	---	---
							{0.0000}	10.12	10.646	---	---
ε_2^2	0.432	0.067	0.024	0.040	0.040	0.072	521.993	1.8666	1136.38	---	---
							{0.0000}	9.6799	30.075	---	---
ε_3^2	0.559	0.245	0.105	0.061	0.099	0.096	1061.53	1.8648	443.485	---	---
							{0.0000}	7.4054	18.204	---	---
ε_4^2	0.486	0.106	0.048	0.043	0.034	0.063	670.326	2.4575	945.661	---	---
							{0.0000}	12.627	27.522	---	---
ε_{EM}^2	0.529	0.104	0.034	0.037	0.032	0.053	775.287	1.2192	1129.37	---	---
							{0.0000}	8.0863	31.071	---	---
ε_{VM}^2	0.447	0.082	0.037	0.049	0.027	0.066	561.843	1.6442	1295.89	---	---
							{0.0000}	9.6070	32.682	---	---

We report means (μ_i), volatility (σ_i), auto-correlation (ρ_i), and the distribution properties kurtosis and skew. The Q is the Ljung-Box (1978) statistics and their p-values are in brackets {}.
*See Table 1 for definition of the ARCH (6) and RESET (12;6) test statistics and their p-values are given in brackets.

Table 6. Optimized Likelihood and Model selection BIC Criteria.

Portfolio:	u	n	s_n	BIC	HQ	AIC	Likelihood	
Thinly	1	1	258729	19434	19425	19416	-9704.99	*
traded	2	1	258306	19437	19425	19414	-9702.86	
Portfolio (R_1)	1	2	258333	19437	19426	19414	-9702.99	
Intermediate								
Thinly	1	1	194169	18684	18675	18666	-9330.24	*
traded	2	1	194155	18692	18680	18668	-9330.15	
Portfolio (R_2)	1	2	193832	18687	18676	18664	-9327.97	
Intermediate								
Frequently	1	1	97546	16887	16878	16869	-8431.52	*
traded	2	1	97545	16895	16883	16871	-8431.52	
Portfolio (R_3)	1	2	97545	16895	16883	16871	-8431.52	
Frequently	1	1	306437	19875	19867	19858	-9925.92	*
traded	2	1	306424	19883	19871	19860	-9925.87	
Portfolio (R_4)	1	2	306398	19883	19871	19860	-9925.76	
Equal Weighted	1	1	113346	17279	17270	17261	-8627.51	*
Market	2	1	113323	17286	17274	17263	-8627.25	
Index (R_{EM})	1	2	113292	17285	17274	17262	-8626.89	
Value Weighted	1	1	187988	18600	18591	18582	-9288.01	*
Market	2	1	187983	18607	18596	18584	-9287.97	
Index (R_{VM})	1	2	188037	18608	18596	18585	-9288.35	

* BIC preferred models.

Table 7. An ARMA-GARCH-in-Mean specification for Portfolio returns*

This table contains the estimated coefficients from the model mean

$R_{i,t} = \alpha_i + \phi_{i,1} \cdot R_{i,t-1} + \sum_{\substack{j=1 \\ i \neq j}}^{4} (R_{j,t-1} \cdot \gamma_{ij}) - \theta_{i,1} \cdot \varepsilon_{i,t-1} - \theta_{i,2} \cdot \varepsilon_{i,t-2} + \varepsilon_{i,t}$,where i = *1, 2, 3, 4, EM, VM* and

$E(\varepsilon_i,t|\Omega_{t-1}) \sim D(0,h_{i,t}, \upsilon_i)$, *D* is the student-t distribution with υ degrees of freedom and for the model volatility $h_{i,t}=m_i + (a_{i,1} + \lambda_{i,1,t})^* \varepsilon_{t-1}^2 + b_{i,1}{}^*h_{i,t-1}$, where $\lambda_{i,1,t} = \varepsilon_{i,t-1}$ iff $\varepsilon_{i,t-1}<0$. The $\gamma_{i,j}$ control for any cross effects of the type identified by Lo and MacKinlay (1990).

Return Series	Log likelihood	α_i	$\phi_i / \theta_{i,2}$	β_i	$\theta_{i,1}$	γ_{i1}	γ_{i2}	γ_{i3}	υ_i
R_1	-5295.41	0.19092	0.05142	-0.05059	0.21640	0.07240	0.05665	0.05541	6.08771
		{1.2311}	{2.6250}	-{0.5830}	{10.7668}	{1.8733}	{1.2543}	{1.9786}	{8.9069}
R_2	-4004.53	-0.02528	---	0.06091	0.13516	0.02754	0.17437	0.08076	5.69920
		-{0.2694}		{0.7107}	{5.7235}	{1.5661}	{6.2192}	{3.3065}	{9.9107}
R_3	-4000.65	-0.01620	---	0.04864	-0.06211	0.00188	0.00496	0.21152	5.79819
		-{0.6682}		{1.1800}	-{2.2501}	{0.1313}	{0.1822}	{9.5229}	{9.5610}
R_4	-4325.09	0.18259	---	-0.08558	-0.25168	0.01345	-0.02075	-0.00787	6.19008
		{2.4649}		-{1.3999}	-{9.3367}	{1.1840}	-{0.7997}	-{0.2422}	{9.2445}
R_{EM}	-3347.27	0.14601	0.17198	-0.09694	---	---	---	---	5.06988
		{2.7663}	{8.3396}	-{1.6100}					{10.8847}
R_{VM}	-3842.35	0.18345	---	-0.09792	-0.24194	---	---	---	6.45581
		{2.5595}		-{1.4167}	-{11.4592}				{8.9356}

Return Series	m_i	a_i	b_{i1}	a_i+b_{i1}	λ_i	Skews	Kurtosis	Q (6)	Q^2 (6)
R_1	0.05267	0.03564	0.95055	0.98619	-0.09518	-0.06293	3.45442	2.2540	21.079
	{2.6797}	{4.6851}	{90.0631}		-{0.6881}			{0.895}	{0.002}
R_2	0.10462	0.10706	0.81743	0.92449	-0.27330	-1.2698	13.9357	1.4960	7.7520
	{3.1839}	{4.9072}	{20.8524}		-{1.9887}			{0.960}	{0.257}
R_3	0.10836	0.15788	0.77044	0.92832	-0.26668	-0.94408	10.6133	2.8310	6.6010
	{3.7337}	{6.1384}	{21.2518}		-{2.9592}			{0.830}	{0.359}
R_4	0.19390	0.20347	0.69609	0.89956	-0.33569	-0.61607	5.76354	11.650	16.219
	{3.3634}	{4.9991}	{11.6728}		-{3.4819}			{0.070}	{0.013}
R_{EM}	0.06611	0.12991	0.79766	0.92758	-0.19598	-1.04078	13.1475	5.2770	13.631
	{3.9107}	{5.6598}	{23.8332}		-{2.5435}			{0.509}	{0.034}
R_{VM}	0.12940	0.14878	0.74098	0.88976	-0.33196	-0.72032	7.00691	10.153	14.650
	{3.5265}	{5.2451}	{14.8135}		-{3.3607}			0.118	{0.023}

*See Table 1 and 2 for definitions of the return series and test statistics. t-values are given in brackets, below each parameter coefficient. The *Q* is the Ljung-Box statistics. Their p-value is given in brackets, below each coefficient.

Table 8. BDS and ARCH test statistics for i.i.d. residuals

Series*	ARCH (6)	RESET (12;6)	Res-idual!	BDS-test statistic: m=2;ε=1	m=3;ε=1	m=4;ε=1	m=5;ε=1	m=6;ε=1	m=7;ε=1	m=8;ε=1
R_1	20.628	11.779	ε	2.3420	1.5097	1.2023	0.9430	0.5436	0.3754	0.2718
	{0.002}	0.4636	$\ln(\varepsilon^2)$	-1.0434	-1.7225	-1.8179	-2.0027	-1.9317	-2.1212	-2.2424
R_2	7.686	13.499	ε	1.7247	1.7166	1.5743	1.2402	1.1240	1.1896	1.1962
	{0.262}	{0.334}	$\ln(\varepsilon^2)$	-0.4405	-1.2493	-0.7225	-0.5082	-0.0129	0.3434	0.7283
R_3	6.460	8.4523	ε	0.8069	0.7797	0.5099	0.2287	0.4103	0.4014	0.5942
	{0.374}	{0.749}	$\ln(\varepsilon^2)$	0.9080	1.6429	1.5374	1.2772	0.8960	0.1974	-0.4677
R_4	15.466	7.169	ε	1.8614	1.7593	1.5673	1.1419	1.1427	1.0600	0.8274
	{0.017}	{0.846}	$\ln(\varepsilon^2)$	-1.1998	-1.0702	-1.7677	-1.4437	-1.1363	-0.9045	0.1413
R_{EM}	13.369	8.1559	ε	2.2676	1.5451	1.1734	0.7718	0.7293	0.5214	0.4001
	{0.038}	{0.773}	$\ln(\varepsilon^2)$	1.3702	1.7538	2.3106	2.5541	2.7253	2.9374	3.1955
R_{VM}	8.333	9.6817	ε	1.1349	1.4170	1.0015	0.6551	0.8835	1.0128	1.1865
	{0.215}	{0.644}	$\ln(\varepsilon^2)$	-0.3541	-1.3481	-1.9556	-1.9230	-1.9302	-1.7664	-1.8072

* See Table 1 for definition of return series and test statistics (ARCH, RESET and BDS).
! Residuals are standardized residuals (ε) or adjusted residuals ($\ln(\varepsilon^2)$) applying results from deLima (1995).

Table 9. Simple and Joint bias test for model misspecification

	Simple bias tests						Joint bias test	
Series*	S_{t-1}		$\varepsilon_{\tau-1} \cdot S_{t-1}$		$\varepsilon_{\tau-1} \cdot S^{*}_{t-1}$		$T \cdot R^2$	$\chi^2(3)$
R_1	0.20398	{1.4887}	-0.46684	-{5.1259}	-0.08382	-{0.8795}	25.026	{0.0000}
R_2	-0.05298	-{0.2066}	-0.41698	-{2.7551}	-0.17266	-{0.9381}	9.137	{0.0275}
R_3	-0.17886	-{0.7993}	-0.17150	-{1.2725}	0.11198	{0.6969}	5.254	{0.1541}
R_4	-0.24602	-{0.4770}	-0.21046	-{1.9979}	0.13106	{1.0857}	11.323	{0.0101}
R_{EM}	-0.17349	-{0.6472}	-0.43625	-{2.8916}	0.09759	{0.5199}	9.608	{0.0222}
R_{VM}	-0.15252	-{0.8610}	-0.29516	-{2.5924}	0.13589	{1.0698}	9.752	{0.0208}

*See Table 1 for definition of return series.
S = Dummy-variable equal to 1 when $\varepsilon_{t-1} \leq 0$, and S* = Dummy-variable equal to 1 when $\varepsilon_{t-1} > 0$.
The simple bias test statistics are simple OLS parameters with associated t-statistics in brackets to the right.
The joint BIAS-test statistic tests the relation $\varepsilon^2_t = a + a_1 \cdot D_{t-1} + a_2 \cdot \varepsilon^2_{t-1} \cdot D_{t-1} + a_3 \cdot \varepsilon^2_{t-1} \cdot (1-D_{t-1})$. The statistic tests whether all the a-parameters are significantly different from zero. $T \cdot R^2$ is χ^2 distributed with 3 degrees of freedom.

Table 10. Number of days for half of a shock to have dissipated

Series*	Trading days	Calender days
R_1	49.8516	72.2057
R_2	8.8283	12.7870
R_3	9.3194	13.4984
R_4	6.5484	9.4847
R_{EM}	9.2196	13.3538
R_{VM}	5.9345	8.5956

*See Table 1 for definition of return series.

Table 11. (Un-)Conditional Volatility Characteristics

Series*	Mean	Standard deviation	Std.Dev./ Mean	Unconditional volatility**
R_1	3.9473	1.9880	0.5036	3.8145
R_2	1.6677	2.6646	1.5978	1.3855
R_3	1.8291	3.4213	1.8704	1.5118
R_4	2.3895	5.3139	2.2239	1.9304
R_{EM}	1.1476	2.7199	2.3700	0.9129
R_{VM}	1.5236	3.1349	2.0575	1.1739

* See Table 1 for definition of return series.
**Unconditional volatility is calculated as m_i / (1- (a_i + b_i)) from the GARCH(1,1) process