

TESTING FOR NORMALITY OF RETURNS.

Stock market returns, January 1, 2009 - December 31,2013

	Ticker	Mean		Standard Deviation		Skewness		Kurtosis		Jarque – Bera Statistic	
<i>Daily Returns</i>											
		Net	Log	Net	Log	Net	Log	Net	Log	Net	Log
<u>Cap range: \$7.737-\$363.101, mil</u>											
PIMCO New York Municipal Income Fund	PNF	0.001	0.001	0.011	0.011	0.13	0.03	7.61	7.44	1118.28	1034.25
American Strategic Income Portfolio III	CSP	0.000	0.000	0.008	0.009	-0.56	-0.74	15.33	15.83	8036.67	8747.89
Dow 30 Premium	DPD	0.001	0.000	0.014	0.014	-1.03	-1.24	12.11	13.32	4571.07	5910.44
<u>Cap range: \$1125.950-\$3026.322, mil</u>											
Glimcher Realty Trust	GRT	0.002	0.001	0.041	0.040	1.73	0.99	16.97	13.87	10862.07	6393.64
Newcastle Investment Corporation	NCT	0.005	0.002	0.068	0.065	2.47	0.95	24.02	17.18	24441.11	10721.64
Industrias Bachoco, S.A. de C.V.	IBA	0.001	0.001	0.024	0.023	2.25	1.08	46.56	31.79	100531.35	43685.55
<u>Cap range: \$3037.480-\$430299.000, mil</u>											
Oracle Corporation	ORCL	0.001	0.001	0.018	0.018	-0.21	-0.41	8.31	8.75	1485.18	1768.21
MetLife, Inc.	MET	0.001	0.000	0.032	0.032	0.30	-0.34	14.18	14.47	6565.59	6916.04
Enersis S A	ENI	0.000	0.000	0.015	0.015	-1.03	-0.40	12.11	7.97	929.70	1328.98
<u>S&P 500</u>	SPY	0.001	0.001	0.012	0.012	-0.16	-0.27	7.03	7.03	858.84	867.25
<i>Weekly Returns</i>											
		Net	Log	Net	Log	Net	Log	Net	Log	Net	Log
<u>Cap range: \$7.737-\$363.101, mil</u>											
PIMCO New York Municipal Income Fund	PNF	0.003	0.003	0.026	0.026	0.85	0.50	11.49	10.14	819.35	566.48
American Strategic Income Portfolio III	CSP	0.001	0.001	0.017	0.017	-0.75	-0.88	6.59	6.90	165.01	199.99
Dow 30 Premium	DPD	0.003	0.002	0.030	0.030	-0.84	-1.11	7.75	8.31	276.56	361.00
<u>Cap range: \$1125.950-\$3026.322, mil</u>											
Glimcher Realty Trust	GRT	0.010	0.006	0.091	0.087	1.54	0.54	11.68	8.70	925.65	367.29
Newcastle Investment Corporation	NCT	0.021	0.012	0.158	0.131	3.82	1.72	27.23	13.95	7042.59	1437.67
Industrias Bachoco, S.A. de C.V.	IBA	0.005	0.004	0.046	0.046	-0.25	-0.53	5.00	5.56	46.22	84.20
<u>Cap range: \$3037.480-\$430299.000, mil</u>											
Oracle Corporation	ORCL	0.004	0.003	0.037	0.037	-0.18	-0.35	3.98	4.10	11.92	18.58
MetLife, Inc.	MET	0.004	0.002	0.066	0.066	0.80	-0.40	14.38	13.33	1441.72	1172.01
Enersis S A	ENI	0.002	0.001	0.035	0.036	-0.07	-0.30	5.00	5.47	43.91	70.21
<u>S&P 500</u>	SPY	0.003	0.003	0.025	0.025	-0.02	-0.15	4.46	4.39	23.34	21.98

Stock market returns, January 1, 2009 - December 31,2013

	Ticker	Mean		Standard Deviation		Skewness		Kurtosis		Jarque – Bera Statistic	
		Net	Log	Net	Log	Net	Log	Net	Log	Net	Log
<u>Cap range: \$7.737-\$363.101, mil</u>											
PIMCO New York Municipal Income Fund	PNF	0.010	0.009	0.046	0.046	0.43	0.26	3.66	3.46	2.91*	1.19*
American Strategic Income Portfolio III	CSP	0.004	0.003	0.035	0.035	0.04	-0.16	4.86	4.75	8.69	7.95
Dow 30 Premium	DPD	0.012	0.010	0.051	0.051	-0.62	-0.86	4.46	4.83	9.16	15.66
<u>Cap range: \$1125.950-\$3026.322, mil</u>											
Glimcher Realty Trust	GRT	0.044	0.034	0.151	0.135	1.72	0.71	9.62	6.14	139.41	29.73
Newcastle Investment Corporation	NCT	0.093	0.058	0.315	0.241	2.64	0.90	12.44	7.04	292.41	48.97
Industrias Bachoco, S.A. de C.V.	IBA	0.024	0.021	0.085	0.082	0.62	0.22	4.66	4.24	10.74	4.36*
<u>Cap range: \$3037.480-\$430299.000, mil</u>											
Oracle Corporation	ORCL	0.018	0.015	0.077	0.076	0.08	-0.17	3.17	3.20	0.13*	0.39*
MetLife, Inc.	MET	0.019	0.013	0.111	0.114	-0.28	-0.94	4.54	6.11	6.67	32.97
Enersis S A	ENI	0.006	0.004	0.073	0.073	0.19	-0.03	3.11	2.97	0.40*	0.01*
<u>S&P 500</u>	SPY	0.017	0.015	0.044	0.044	-0.45	-0.58	3.11	3.27	2.02*	3.50*

Asterisks indicated JB statistics that are not statistically different from 0 at 5% level of significance

Table contains a sample statistic for nine listed stocks from NYSE, plus a market portfolio represented by the S&P 500 index. Sample period is from January 1, 2009 until December 31, 2013. Individual stocks are selected in the following manner. Three random tickets picked from first, third and fifth quintiles when stocks ranged by market capitalization. Then the prices of these stocks examined on daily, weekly and monthly horizons. In addition to four first sample moments, the table reports Jarque-Bera Statistic. Jarque-Bera statistics marked with asterisks are not statistically different from zero for $\alpha=0.05$, implying normality of given returns.

None of stocks and indexes daily and weekly returns exhibit normality. Meanwhile, four stocks and SPY index were normally distributed monthly returns. The net returns of IBA for both weekly and monthly frequencies had a moderate right skewness, so only log returns were normally distributed as JB indicates.

We could expect that kurtosis for the index is higher than for individual stocks since it is a usual empirical case, however, in our data situation is quite the opposite. In daily data, SPY's kurtosis in log and net returns is 7.03, which is lower than kurtosis of any daily observed individual stocks. On weekly panel index does exhibit kurtosis lower (4.46) than any individual stock, that is the evidence of fat tail of individual stocks. Likewise, SPY's tails on monthly horizon are the smallest in the table, which is evident by minimum value of kurtosis. Noteworthy, that the third moments indicate some degree of symmetry for most stocks, however, leptokurtosis surges JB statistic leading to non-normality.

TESTING FOR RANDOM WALK 1 AND RANDOM WALK 3

Ticker	Mean	Autocorrelation coefficients									
		ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	ρ_6	ρ_7	ρ_8	ρ_9	ρ_{10}
Daily Returns											
First Quintile											
PNF	0.0005	0.0543	0.0224	-0.0468	-0.0691*	0.0228	-0.0569*	-0.0130	-0.0186	0.0211	0.0546
CSP	0.0001	-0.0102	-0.0014	-0.1006*	-0.0968	-0.0438	0.0511	-0.0011	0.0223	0.0517	0.0539
DPD	0.0004	-0.0023	-0.0493	-0.0029	0.0427	-0.0214	0.0274	-0.0339	-0.0188	0.0159	0.0299
Third Quintile											
GRT	0.0013	-0.1132*	-0.0348	0.0138	0.0526	0.0147	-0.0688*	0.0032	0.0134	0.0297	0.0915*
NCT	0.0024	-0.2062**	0.1256*	-0.1055*	0.0280	-0.0545*	0.1082*	-0.0868*	0.1041*	-0.1207*	0.1883*
IBA	0.0009	-0.0515	-0.0630*	0.0210	-0.0179	0.0637*	0.0311	-0.0908*	-0.0517	0.0939*	-0.0179
Fifth Quintile											
ORCL	0.0006	-0.0436	0.0370	-0.0314	0.0118	-0.0092	0.0191	-0.0051	-0.0090	-0.0025	0.0391
MET	0.0004	-0.1422**	0.1306*	-0.1194*	0.1093*	-0.0993*	0.0709*	-0.0349	0.0130	-0.0974*	0.0833*
ENI	0.0002	0.0575*	0.0017	-0.0623*	0.0246	-0.0804*	-0.0151	0.0196	0.0654*	-0.0363	0.0092
SPY	0.0006	-0.0764*	0.0306	-0.0637*	0.0573*	-0.0655*	-0.0095	0.0073	-0.0051	-0.0257	0.0518

Asterisks indicated that autocorrelation coefficient statistically different from 0 at 5% level of significance under RW1

Double asterisks indicated that autocorrelation coefficient statistically different from 0 at 5% level of significance under RW3 based on VR statistic

Ticker	Box-Pierce statistic			Variance Ratio		
	Q5	Q10	q=4	psi	q=8	psi
First Quintile						
PNF	13.6254*	22.5818*	1.0804	0.9706	0.9865	-0.1045
CSP	26.8138*	37.6525*	0.9330	-0.5410	0.7500	-1.4608
DPD	5.8898	10.1390	0.9458	-0.5005	0.9502	-0.3105
Third Quintile						
GRT	21.4446*	39.1204*	0.8023	-1.7555	0.7969	-1.1666
NCT	91.2490*	191.1417*	0.7635	-1.6892	0.7151	-1.3237
IBA	14.2679*	40.4779*	0.8703	-0.9668	0.8644	-0.7459
Fifth Quintile						
ORCL	5.5921	8.0941	0.9559	-0.6817	0.9531	-0.4604
MET	91.4775*	119.9690*	0.8575	-1.1795	0.8592	-0.7306
ENI	17.7828*	25.6239*	1.0568	0.8409	0.9870	-0.1264
SPY	22.9423*	27.3233*	0.8841	-1.4911	0.8378	-1.3003

Q statistics with an asterisk indicate a rejection of null hypothesis under RW1

The statistical significance of the Q-statistic, the magnitudes and decay pattern of the first 10 autocorrelations suggest the presence of a high-frequency predictable component in almost all daily returns. Only DPD and ORCL returns are completely random. MET is the stock with the highest number of significant lags. Pearson coefficients marked with an asterisk are statistically different from zero for $\alpha=0.05$. This is the result of individual testing of ρ coefficients. Correspondently, if any of coefficients from ρ_1 until ρ_5 are statistically different from zero, then Q5, which has Chi-squared distribution with 5 DOF, is to the right to 11,07. Those significant Box-Pierce statistics are marked with asterisk. The same logic works for coefficients from ρ_1 until ρ_{10} and, correspondent, Q10. Under random walk 3 only NCT's and MET's first rho coefficients are statistically significant based on variance ration statistics.

Ticker	Mean	Autocorrelation coefficients					Box-Pirce statistic			Variance Ratio		
		ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	Q5	Q10	q=4	psi	q=8	psi
<i>Weekly Returns</i>												
First Quintile												
PNF	0.0026	-0.0868	0.0564	-0.0259	0.1344*	0.0506	8.0380	16.0878	0.9132	-0.6214	0.9887	-0.0465
CSP	0.0007	-0.0637	0.0678	0.0687	0.1084	-0.0344	6.6040	8.3473	1.0067	0.0333	1.1791	0.6152
DPD	0.0021	-0.0049	-0.0997	0.0400	-0.0550	-0.1469*	9.0810	15.7054	0.9130	-0.4359	0.6854	-1.0266
Third Quintile												
GRT	0.006	-0.146*	0.0701	0.024	-0.0959	0.063	10.03	32.5785*	0.8631	-0.5889	0.8007	-0.5362
NCT	0.012	-0.140*	0.028	-0.084	0.017	-0.050	7.57	18.9808*	0.775	-1.3892	0.7000	-1.1468
IBA	0.004	-0.045	0.012	0.077	0.021	0.059	3.02	6.4885	0.983	-0.103	1.1259	0.4914
Fifth Quintile												
ORCL	0.003	0.0656	-0.0293	-0.0452	-0.0953	-0.0853	5.9130	10.0058	1.0466	0.3513	0.8304	-0.8202
MET	0.002	0.0106	0.0657	-0.1456*	-0.0435	-0.1140	10.1673	27.2534*	1.0089	0.0294	0.8069	-0.4658
ENI	0.0011	-0.1033	0.0409	0.0474	-0.0183	-0.0082	3.7659	5.9386	0.9096	-0.6891	0.9243	-0.3916
SPY	0.003	-0.0568	0.0094	-0.0184	-0.1002	-0.0757	4.8756	26.0382*	0.9150	-0.5162	0.7094	-1.1596

Asterisks indicated that autocorrelation coefficient statistically different from 0 at 5% level of significance

Q statistics with an asterisk indicate a rejection of null hypothesis under RW1

With lower frequency, less lags become significant when using individual coefficient test suggested by Taylor. As the author himself noticed this test, that assume variance to be approximately $1/T$, can be unreliable. As can be seem from the data none Q5 statistics are higher than 11.07 (critical value for Chi-square distribution with 5 DOF), making individual tests unwarranted. However, lags of higher order that are not included in the table are statistically significant. GRT has eighth lag significant in individual testing (z-statistic is 2.07) and Q10 statistic confirms this predictability component. NCT's first lag is significant in individual testing, but Q5 does not confirm it. In the same manner, Q10 indicates some predictability on lags of higher order, but individual test cannot verify it. MET's Q10 statistics suggest a higher

order significant lags, which is confirmed by individual testing of rho 9 (z-statistic -3.6). The same situation is with a market proxy; Q10 is higher than critical value, and lag 8 and 9 have z-statistics 3.32 and -2.43, respectively. Working with high order lags on low frequency requests some degree of caution: statistical tests can establish specific patterns, but on long horizons, changes in fundamentals (institutions, technologies etc) of economy add to much noise and tests could be unreliable.

Ticker	Mean	Autocorrelation coefficients					Box-Pierce statistic			Variance Ratio		
		ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	Q5	Q10	q=4	psi	q=8	psi
Monthly Returns												
First Quintile												
PNF	0.0090	0.1565	-0.0654	0.0409	-0.0298	0.1417	2.5195	4.0895	1.1898	0.6958	1.3438	0.8113
CSP	0.0032	0.3338(*)**	0.0951**	-0.1004	-0.2293	-0.1427	9.9703*	11.3388	1.5455	1.2971	1.2795	0.6066
DPD	0.0102	-0.0149	-0.2406	-0.0927	0.0892	-0.1299	4.4859	11.7447	0.6906	-1.0066	0.3830	-1.4309
Third Quintile												
GRT	0.0336	0.1137	0.1256	0.1072	-0.4578*	-0.1098	12.8285*	24.7243*	1.3498	1.3956	0.9859	-0.0352
NCT	0.0578	0.0761	0.0486	0.0142	-0.2417	-0.2286	5.8319	14.0685	1.1699	0.4764	0.9456	-0.1109
IBA	0.0206	0.0167	0.0826	0.1196	0.0484	0.0484	1.2789	6.4523	1.1675	0.5873	1.3909	0.9500
Fifth Quintile												
ORCL	0.0147	-0.1515	-0.1669	0.0905	-0.0634	0.0838	3.4302	6.5338	0.6512	-1.4001	0.5560	-1.1427
MET	0.0125	-0.0560	-0.0624	-0.0188	0.0066	-0.2065	2.4537	3.7890	0.8441	-0.4978	0.6534	-0.7979
ENI	0.0061	-0.0387	0.0395	-0.1795	-0.1554	-0.2657	6.3704	10.8808	0.8918	-0.4099	0.4370	-1.4272
SPY	0.0154	-0.0679	-0.0819	0.0514	-0.1083	-0.0617	1.4457	4.5791	0.8418	-0.6103	0.5662	-1.1636

Asterisks indicated that autocorrelation coefficient statistically different from 0 at 5% level of significance under RW1

Double asterisks indicated that autocorrelation coefficient statistically different from 0 at 5% level of significance under RW3 based on VR statistic

Q statistics with an asterisk indicate a rejection of null hypothesis under RW1

Noteworthy that the data suggest that CSP has two significant coefficients under RW3, while only one under RW1. Under RW1 rho 1 is significant in individual testing, this is also confirmed by Q5 statistics. Psi values, normalized VR statistics, for rho 1 and rho 2 are 1.966 and 1.9658, respectively. GRT's significant rho coefficient is confirmed by Q5, while Q10 statistic suggest higher order significant (8th, z-statistic 2.24, and 10th, z-statistic 2.13) coefficients that are also confirmed by individual tests.