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## LAMPIRAN

### Lampiran 1 Data indeks Harga saham penutupan

No	Tanggal	S&P 500	CAC 40	DAX	Nikei 225
1	4-Jan-06	1280.50	4838.52	5523.6	16361.54
2	5-Jan-06	1281.25	4835.09	5516.5	16425.37
3	6-Jan-06	1291.75	4867.15	5536.3	16428.21
4	10-Jan-06	1296.00	4861.93	5494.7	16124.35
5	11-Jan-06	1299.75	4890.49	5532.9	16363.59
6	12-Jan-06	1293.50	4890.24	5542.1	16445.19
7	13-Jan-06	1292.75	4850.53	5483.1	16454.95
8	16-Jan-06	1294.75	4856.09	5514.6	16268.03
9	17-Jan-06	1289.50	4807.14	5460.2	15805.95
10	18-Jan-06	1283.75	4772.09	5395.6	15341.18
11	19-Jan-06	1288.25	4814.09	5430.8	15696.28
12	20-Jan-06	1264.75	4773.48	5349	15696.69
13	23-Jan-06	1269.25	4751.99	5348.7	15360.65
14	24-Jan-06	1270.50	4748.32	5334.3	15648.89
15	25-Jan-06	1271.00	4791	5427.1	15651
16	26-Jan-06	1277.75	4876.52	5548.9	15891.02
17	27-Jan-06	1289.25	4956.6	5647.4	16460.68
18	30-Jan-06	1288.50	4936.79	5660	16551.23
19	31-Jan-06	1283.50	4947.99	5674.1	16649.82
20	1-Feb-06	1287.25	4999.39	5726.5	16480.09
21	2-Feb-06	1272.00	4927.89	5649.6	16710.55
22	3-Feb-06	1265.50	4937.56	5657.1	16659.64
23	6-Feb-06	1268.75	4934.59	5666.8	16747.76
24	7-Feb-06	1257.50	4935.4	5672.9	16720.99
25	8-Feb-06	1268.25	4895.08	5666.4	16272.68
26	9-Feb-06	1265.75	4955.74	5743.7	16439.67
27	10-Feb-06	1268.25	4910.82	5701.5	16257.83
28	13-Feb-06	1265.75	4957.36	5756.3	15877.66
29	14-Feb-06	1278.25	4961.34	5763.4	16184.87
30	15-Feb-06	1282.25	4934.09	5764.4	15932.83
31	16-Feb-06	1291.75	4973.09	5789.3	16043.67
32	17-Feb-06	1289.00	5000	5795.5	15713.45
33	20-Feb-06	1288.75	4979.94	5794	15437.93
34	21-Feb-06	1285.25	4991.93	5801	15894.94
35	22-Feb-06	1292.25	5041.6	5862.1	15781.78
36	23-Feb-06	1290.25	5040.39	5857.9	16096.1
37	24-Feb-06	1293.00	5073.95	5870.8	16101.91
38	27-Feb-06	1294.00	5080.52	5915.1	16192.95
39	28-Feb-06	1282.50	5000.45	5796	16205.43

No	Tanggal	S&P 500	CAC 40	DAX	Nikei 225
40	1-Mar-06	1292.00	5057.61	5866.6	15964.46
41	2-Mar-06	1291.50	5009.09	5783.5	15909.76
42	3-Mar-06	1286.50	4989.15	5721.5	15663.34
43	6-Mar-06	1279.50	5010.72	5754.1	15901.16
44	7-Mar-06	1277.50	4992.21	5739.3	15726.02
45	8-Mar-06	1279.50	4969.51	5673.4	15627.49
46	9-Mar-06	1272.00	5007.84	5732.2	16036.91
47	10-Mar-06	1283.00	5069.27	5804.9	16115.63
48	13-Mar-06	1285.50	5107.47	5855.2	16361.51
49	14-Mar-06	1298.50	5117.16	5870.9	16238.36
50	15-Mar-06	1303.75	5127.93	5898.5	16319.04
51	16-Mar-06	1306.25	5126.01	5897.8	16096.21
52	17-Mar-06	1310.16	5141.08	5882.4	16339.73
53	20-Mar-06	1315.50	5138.51	5902.8	16624.8
54	22-Mar-06	1314.50	5194.78	5932.3	16495.48
55	23-Mar-06	1311.75	5194.78	5947.1	16489.37
56	24-Mar-06	1312.75	5218.71	5973.1	16560.87
57	27-Mar-06	1311.00	5162.44	5912.3	16650.1
58	28-Mar-06	1302.50	5149.99	5890.6	16690.24
59	29-Mar-06	1310.00	5180.25	5914.8	16938.41
60	30-Mar-06	1307.50	5240.1	5984.2	17045.34
61	31-Mar-06	1307.50	5220.85	5970.1	17059.66
62	3-Apr-06	1305.75	5255.26	6024	17333.31
63	4-Apr-06	1314.75	5205.81	6013.9	17292.91
64	5-Apr-06	1319.00	5221.03	6029.2	17243.98
65	6-Apr-06	1317.50	5222.36	6031.4	17489.33
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3800	19-Jul-21	4251.25	6295.97	15133	28003.08
3801	20-Jul-21	4315.50	6346.85	15216	27652.74
3802	21-Jul-21	4350.50	6464.48	15423	27388.16
3803	22-Jul-21	4359.50	6481.59	15515	27548
3804	23-Jul-21	4403.00	6568.82	15669	27833.29
3805	26-Jul-21	4414.25	6578.6	15619	27970.22
3806	27-Jul-21	4394.50	6531.92	15519	27581.66
3807	28-Jul-21	4393.75	6609.31	15570	27782.42
3808	29-Jul-21	4411.75	6633.77	15640	27283.59
3809	30-Jul-21	4389.50	6612.76	15544	27781.02
3810	2-Aug-21	4379.75	6675.9	15569	27641.83
3811	3-Aug-21	4415.00	6723.81	15555	27584.08
3812	4-Aug-21	4394.75	6746.23	15692	27728.12

No	Tanggal	S&P 500	CAC 40	DAX	Nikei 225
3813	5-Aug-21	4421.50	6781.19	15745	27820.04
3814	6-Aug-21	4429.50	6816.96	15761	27888.15
3815	10-Aug-21	4430.00	6820.21	15771	28070.51
3816	11-Aug-21	4440.50	6857.99	15826	28015.02
3817	12-Aug-21	4454.50	6882.47	15938	27977.15
3818	13-Aug-21	4462.50	6896.04	15977	27523.19
3819	16-Aug-21	4474.00	6838.77	15926	27424.47
3820	17-Aug-21	4443.50	6819.84	15922	27585.91
3821	18-Aug-21	4394.50	6770.11	15966	27281.17
3822	19-Aug-21	4401.50	6605.89	15766	27013.25
3823	20-Aug-21	4437.00	6626.11	15808	27494.24
3824	23-Aug-21	4475.50	6683.1	15853	27732.1
3825	24-Aug-21	4482.50	6664.31	15906	27724.8
3826	25-Aug-21	4493.00	6676.48	15861	27742.29
3827	26-Aug-21	4466.50	6666.03	15794	27641.14
3828	27-Aug-21	4505.50	6681.92	15852	27789.29
3829	30-Aug-21	4525.25	6687.3	15887	28089.54
3830	31-Aug-21	4520.50	6680.18	15835	28451.02
3831	1-Sep-21	4521.25	6758.69	15824	28543.51
3832	2-Sep-21	4535.25	6763.08	15841	29128.11
3833	3-Sep-21	4534.50	6689.99	15781	29659.89
3834	7-Sep-21	4519.25	6726.07	15843	29916.14
3835	8-Sep-21	4512.50	6668.89	15610	30181.21
3836	9-Sep-21	4492.25	6684.72	15623	30008.19
3837	10-Sep-21	4458.25	6663.77	15610	30381.84
3838	13-Sep-21	4469.00	6676.93	15701	30447.37
3839	14-Sep-21	4444.50	6652.97	15723	30670.1
3840	15-Sep-21	4481.75	6583.62	15616	30511.71
3841	16-Sep-21	4474.25	6622.59	15652	30323.34
3842	17-Sep-21	4464.33	6570.19	15490	30500.05
3843	20-Sep-21	4348.25	6455.81	15132	29839.71
3844	21-Sep-21	4343.25	6552.73	15349	29639.4
3845	22-Sep-21	4384.00	6637	15507	30248.81
3846	24-Sep-21	4445.75	6638.46	15532	30240.06
3847	27-Sep-21	4433.00	6650.91	15574	30183.96
3848	28-Sep-21	4343.50	6506.5	15249	29544.29
3849	29-Sep-21	4349.75	6560.8	15365	29452.66
3850	30-Sep-21	4297.75	6520.01	15261	28771.07

**Lampiran 2** Return Harga saham penutupan

No	Tanggal	Return S&P 500	Return CAC 40	Return DAX	Return NIKEI 225
1	4-Jan-06	0	0	0	0
2	5-Jan-06	0.000585709	-0.000708931	-0.001283639	0.003901167
3	6-Jan-06	0.008195122	0.006630706	0.003587407	0.000173013
4	10-Jan-06	0.00329011	-0.00107244	-0.007515798	-0.018496313
5	11-Jan-06	0.002893519	0.005874222	0.006948533	0.014837202
6	12-Jan-06	-0.004808617	-5.11196E-05	0.001669967	0.004986657
7	13-Jan-06	-0.000579822	-0.008120347	-0.010652951	0.000593472
8	16-Jan-06	0.00154709	0.001146279	0.005754108	-0.011359436
9	17-Jan-06	-0.004054837	-0.010080066	-0.009879154	-0.028404181
10	18-Jan-06	-0.004459093	-0.007291298	-0.011822051	-0.029404781
11	19-Jan-06	0.003505355	0.008801175	0.006529379	0.023146889
12	20-Jan-06	-0.018241801	-0.008435627	-0.015065777	2.61308E-05
13	23-Jan-06	0.003558015	-0.004501903	-5.60486E-05	-0.021408337
14	24-Jan-06	0.000984834	-0.000772394	-0.002696049	0.018764782
15	25-Jan-06	0.000393546	0.00898848	0.01739498	0.000134856
16	26-Jan-06	0.005310779	0.01785014	0.02244671	0.015335731
17	27-Jan-06	0.009000196	0.016421562	0.017752994	0.03584793
18	30-Jan-06	-0.000581734	-0.003996703	0.002232854	0.005501035
19	31-Jan-06	-0.003880481	0.00226872	0.002494707	0.005956647
20	1-Feb-06	0.002921698	0.010388036	0.009231318	-0.010194132
21	2-Feb-06	-0.011846961	-0.014301744	-0.01343391	0.013984204
22	3-Feb-06	-0.005110063	0.001962284	0.001331071	-0.003046588
23	6-Feb-06	0.002568155	-0.000601555	0.001707524	0.005289378
24	7-Feb-06	-0.008866995	0.000164159	0.001083532	-0.001598395
25	8-Feb-06	0.008548708	-0.008169515	-0.001147516	-0.026811244
26	9-Feb-06	-0.00197122	0.012392066	0.013636503	0.010262
27	10-Feb-06	0.001975114	-0.009064319	-0.00734894	-0.01106104
28	13-Feb-06	-0.00197122	0.009477041	0.009622056	-0.023383805
29	14-Feb-06	0.009875568	0.000802843	0.001228183	0.019348566
30	15-Feb-06	0.003129278	-0.005492468	0.000168341	-0.015572571
31	16-Feb-06	0.007408852	0.007904193	0.004316149	0.006956695
32	17-Feb-06	-0.002128895	0.005411154	0.001076129	-0.020582556
33	20-Feb-06	-0.000193949	-0.004012012	-0.000263962	-0.017534055
34	21-Feb-06	-0.00271581	0.002407707	0.001223663	0.029603111
35	22-Feb-06	0.005446411	0.009950043	0.010518807	-0.007119256
36	23-Feb-06	-0.001547688	-0.000239995	-0.00071309	0.019916596
37	24-Feb-06	0.00213137	0.006658226	0.002203896	0.000360991
38	27-Feb-06	0.000773395	0.001294815	0.00755603	0.00565399
39	28-Feb-06	-0.008887172	-0.015760163	-0.020136407	0.000770674
40	1-Mar-06	0.007407407	0.011430904	0.012175524	-0.014869691

No	Tanggal	Return S&P 500	Return CAC 40	Return DAX	Return NIKEI 225
41	2-Mar-06	-0.000386997	-0.009593468	-0.014168256	-0.003426373
42	3-Mar-06	-0.003871467	-0.003980752	-0.010725405	-0.015488601
43	6-Mar-06	-0.005441119	0.004323445	0.005697864	0.015183244
44	7-Mar-06	-0.001563111	-0.00369413	-0.002568669	-0.01101433
45	8-Mar-06	0.001565558	-0.004547123	-0.011485748	-0.006265368
46	9-Mar-06	-0.005861665	0.00771305	0.010374867	0.0261987
47	10-Mar-06	0.008647799	0.012266801	0.012682644	0.004908659
48	13-Mar-06	0.001948558	0.00753564	0.008654768	0.015257231
49	14-Mar-06	0.010112797	0.001897209	0.002684765	-0.007526776
50	15-Mar-06	0.004043127	0.002104687	0.004701186	0.004968463
51	16-Mar-06	0.001917546	-0.0003745	-0.000116969	-0.013654607
52	17-Mar-06	0.002993301	0.002939969	-0.00261287	0.015129059
53	20-Mar-06	0.004075838	-0.000499956	0.003469711	0.017446451
54	22-Mar-06	-0.000760167	0.010950649	0.005001028	-0.007778759
55	23-Mar-06	-0.00209205	0	0.002494779	-0.000370485
56	24-Mar-06	0.00076234	0.004606581	0.004376962	0.004336127
57	27-Mar-06	-0.001333079	-0.010782362	-0.010192356	0.00538803
58	28-Mar-06	-0.0064836	-0.002411594	-0.00365848	0.002410834
59	29-Mar-06	0.005758157	0.005875694	0.004099715	0.014869164
60	30-Mar-06	-0.001908397	0.011553515	0.011735036	0.006312853
61	31-Mar-06	0	-0.003673594	-0.002357857	0.000840131
62	3-Apr-06	-0.001338432	0.006590817	0.009040034	0.016040788
63	4-Apr-06	0.00689259	-0.009409565	-0.001693164	-0.002330795
64	5-Apr-06	0.003232554	0.002923604	0.002552458	-0.002829465
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3800	19-Jul-21	-0.015572537	-0.025403689	-0.026196993	-0.009760207
3801	20-Jul-21	0.015113202	0.008081341	0.005489211	-0.012510761
3802	21-Jul-21	0.0081103	0.018533584	0.013553287	-0.009567952
3803	22-Jul-21	0.002068728	0.00264675	0.005967907	0.005836093
3804	23-Jul-21	0.009978209	0.013458115	0.009974514	0.010356072
3805	26-Jul-21	0.002555076	0.001488894	-0.003210712	0.004919707
3806	27-Jul-21	-0.004474146	-0.007095761	-0.0063929	-0.013891937
3807	28-Jul-21	-0.000170668	0.011847992	0.003301117	0.007278741
3808	29-Jul-21	0.004096728	0.003700834	0.004502746	-0.017954882
3809	30-Jul-21	-0.00504335	-0.003167166	-0.006143043	0.018231827
3810	2-Aug-21	-0.00222121	0.009548228	0.001565891	-0.005010236
3811	3-Aug-21	0.008048405	0.007176584	-0.000876783	-0.002089225
3812	4-Aug-21	-0.004586636	0.003334407	0.008810614	0.005221819
3813	5-Aug-21	0.006086808	0.005182148	0.003348178	0.003315044

No	Tanggal	Return S&P 500	Return CAC 40	Return DAX	Return NIKEI 225
3814	6-Aug-21	0.001809341	0.005274888	0.001065775	0.002448283
3815	10-Aug-21	0.00011288	0.000476752	0.000587495	0.006538956
3816	11-Aug-21	0.002370203	0.005539459	0.003511566	-0.001976816
3817	12-Aug-21	0.003152798	0.003569556	0.007040269	-0.001351744
3818	13-Aug-21	0.001795937	0.00197165	0.002505452	-0.016226132
3819	16-Aug-21	0.002577031	-0.008304769	-0.003236436	-0.003586748
3820	17-Aug-21	-0.006817166	-0.002768067	-0.000237369	0.005886693
3821	18-Aug-21	-0.011027343	-0.007291957	0.002764707	-0.011046952
3822	19-Aug-21	0.0015929	-0.024256582	-0.012536674	-0.00982069
3823	20-Aug-21	0.008065432	0.003060863	0.002678611	0.017805715
3824	23-Aug-21	0.008677034	0.008600859	0.002830838	0.008651244
3825	24-Aug-21	0.001564071	-0.002811575	0.003347018	-0.000263191
3826	25-Aug-21	0.002342443	0.001826134	-0.002841059	0.000630781
3827	26-Aug-21	-0.005898064	-0.001565225	-0.004226813	-0.003646002
3828	27-Aug-21	0.008731669	0.002383748	0.003680593	0.005359708
3829	30-Aug-21	0.004383531	0.00080514	0.002243258	0.010804523
3830	31-Aug-21	-0.001049666	-0.001064649	-0.003286883	0.012868864
3831	1-Sep-21	0.000165911	0.011752642	-0.000682017	0.003250858
3832	2-Sep-21	0.003096489	0.000649554	0.00103005	0.020480999
3833	3-Sep-21	-0.000165371	-0.010807183	-0.003749207	0.018256635
3834	7-Sep-21	-0.003363105	0.005393071	0.003921733	0.008639614
3835	8-Sep-21	-0.001493611	-0.008501203	-0.014694707	0.008860445
3836	9-Sep-21	-0.004487535	0.00237372	0.000824464	-0.005732755
3837	10-Sep-21	-0.00756859	-0.003134042	-0.000853914	0.012451614
3838	13-Sep-21	0.00241126	0.001974881	0.005868768	0.002156857
3839	14-Sep-21	-0.005482211	-0.00358847	0.001373781	0.007315262
3840	15-Sep-21	0.008381145	-0.01042393	-0.0068047	-0.00516427
3841	16-Sep-21	-0.001673453	0.005919194	0.002289319	-0.006173731
3842	17-Sep-21	-0.002217131	-0.007912298	-0.010323451	0.005827555
3843	20-Sep-21	-0.026001662	-0.017408916	-0.023118555	-0.021650451
3844	21-Sep-21	-0.001149888	0.015012821	0.014305436	-0.006712885
3845	22-Sep-21	0.009382375	0.012860292	0.010307825	0.020560813
3846	24-Sep-21	0.01408531	0.000219973	0.001612832	-0.000289268
3847	27-Sep-21	-0.002867908	0.001875464	0.002712501	-0.001855142
3848	28-Sep-21	-0.020189488	-0.021712841	-0.020888842	-0.021192443
3849	29-Sep-21	0.001438932	0.008345471	0.007653835	-0.003101408
3850	30-Sep-21	-0.01195471	-0.006217236	-0.0068062	-0.023141877



### Lampiran 3 Data Ekstrem

#### A. Data Ekstrem S&P 500

No	Data Ekstrem	No	Data Ekstrem	No	Data Ekstrem	No	Data Ekstrem
1	0.010112797	128	0.027180068	255	0.020483484	382	0.010441693
2	0.014873479	129	0.026836158	256	0.019823789	383	0.025009094
3	0.011895321	130	0.014005602	257	0.019593872	384	0.015793456
4	0.010809748	131	0.014364641	258	0.01233067	385	0.020840884
5	0.021328458	132	0.022875817	259	0.010235947	386	0.013340745
6	0.019677996	133	0.020601336	260	0.011729163	387	0.021613564
7	0.013445715	134	0.024306548	261	0.016731017	388	0.011782833
8	0.018276762	135	0.028563505	262	0.01080497	389	0.011042448
9	0.01138818	136	0.01280683	263	0.012367491	390	0.010056315
10	0.010188389	137	0.020537125	264	0.052745665	391	0.034112961
11	0.011166946	138	0.016505841	265	0.015577889	392	0.013755811
12	0.011793698	139	0.011557789	266	0.012474012	393	0.011199696
13	0.016942977	140	0.011224744	267	0.016358925	394	0.016002273
14	0.014060396	141	0.011500128	268	0.011246787	395	0.013477338
15	0.015103618	142	0.020403085	269	0.010205684	396	0.01221068
16	0.01259023	143	0.0122286	270	0.010577955	397	0.013469239
17	0.015070328	144	0.010848126	271	0.016614907	398	0.010174651
18	0.014187949	145	0.016900738	272	0.012443615	399	0.012557481
19	0.010227648	146	0.017291066	273	0.01304216	400	0.011540833
20	0.016165905	147	0.014436017	274	0.011752455	401	0.010282776
21	0.015603567	148	0.011577424	275	0.011151848	402	0.011489134
22	0.017151767	149	0.017777778	276	0.01143695	403	0.020185488
23	0.010049395	150	0.011827458	277	0.021986353	404	0.010278485
24	0.01450253	151	0.022147328	278	0.012559102	405	0.010286999
25	0.017901018	152	0.015520535	279	0.011889414	406	0.016254417
26	0.012756421	153	0.023915592	280	0.0117713	407	0.020656136
27	0.011592226	154	0.013513514	281	0.017704089	408	0.01796719
28	0.018946637	155	0.011926606	282	0.012901376	409	0.015095664
29	0.010434485	156	0.012559945	283	0.015284461	410	0.011153381
30	0.012025425	157	0.011923162	284	0.010447137	411	0.01069611
31	0.029113067	158	0.014712751	285	0.015463918	412	0.012803876
32	0.012028609	159	0.010126582	286	0.010704607	413	0.011183758
33	0.011918183	160	0.012461792	287	0.010274887	414	0.011400374
34	0.01147541	161	0.013206673	288	0.017505187	415	0.024474918
35	0.012369792	162	0.012697706	289	0.016482032	416	0.010115607
36	0.012952507	163	0.010223642	290	0.01010101	417	0.010875063
37	0.029855928	164	0.01131601	291	0.02	418	0.011012874
38	0.012240553	165	0.012815126	292	0.010909091	419	0.011961722

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
39	0.030844725	166	0.012674271	293	0.011752683	420	0.016638422
40	0.016230993	167	0.044715447	294	0.011566507	421	0.010759206
41	0.013786147	168	0.015187676	295	0.021683997	422	0.038630973
42	0.010034238	169	0.013551402	296	0.025195482	423	0.039289289
43	0.010379384	170	0.03745583	297	0.01253447	424	0.042944227
44	0.024632423	171	0.025479196	298	0.017578609	425	0.091940057
45	0.015367316	172	0.010734733	299	0.012066365	426	0.032798758
46	0.021473528	173	0.026764567	300	0.014803849	427	0.014451264
47	0.012685756	174	0.021091243	301	0.01355762	428	0.097950912
48	0.010372291	175	0.034171345	302	0.014332411	429	0.011894996
49	0.011877536	176	0.012308407	303	0.012394646	430	0.057154439
50	0.038024304	177	0.022321429	304	0.012315271	431	0.034568146
51	0.042236996	178	0.011721443	305	0.012012748	432	0.027982026
52	0.037508444	179	0.021397678	306	0.013050372	433	0.065149532
53	0.035120846	180	0.011142061	307	0.012533141	434	0.035200606
54	0.026197605	181	0.018186169	308	0.011205847	435	0.016361974
55	0.0114775	182	0.031958025	309	0.014550265	436	0.022753845
56	0.021464646	183	0.012849931	310	0.011634881	437	0.029596413
57	0.011339093	184	0.010362694	311	0.010981141	438	0.02068082
58	0.011898419	185	0.020303436	312	0.012980769	439	0.017531242
59	0.020145191	186	0.017625028	313	0.01215733	440	0.013960064
60	0.012304251	187	0.017749008	314	0.013594611	441	0.02572151
61	0.017575394	188	0.017197452	315	0.012324795	442	0.011680382
62	0.024349979	189	0.015489073	316	0.011019617	443	0.016410799
63	0.010072522	190	0.021195422	317	0.012659754	444	0.016840278
64	0.010107015	191	0.015151515	318	0.03484181	445	0.01208674
65	0.021659919	192	0.010232192	319	0.026444788	446	0.035657825
66	0.018228651	193	0.015789474	320	0.016179541	447	0.017044968
67	0.027427427	194	0.012281712	321	0.022895798	448	0.014053505
68	0.019124606	195	0.018380241	322	0.013178096	449	0.013691768
69	0.013132105	196	0.011916584	323	0.018271539	450	0.013243419
70	0.012480499	197	0.010959764	324	0.013695057	451	0.024513744
71	0.020950846	198	0.010255418	325	0.01634071	452	0.012787323
72	0.014392864	199	0.010942599	326	0.017641129	453	0.012604004
73	0.016108787	200	0.015093619	327	0.022155838	454	0.018141881
74	0.032306698	201	0.010526316	328	0.011647658	455	0.016809263
75	0.067648654	202	0.014549744	329	0.010488246	456	0.013551713
76	0.017183571	203	0.011187439	330	0.014614813	457	0.013944713
77	0.044916201	204	0.014299706	331	0.015007321	458	0.01374241
78	0.124859708	205	0.014633219	332	0.018159659	459	0.011938873
79	0.041793523	206	0.011978289	333	0.01337627	460	0.011196697

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
80	0.061060525	207	0.015955402	334	0.012955268	461	0.011308308
81	0.01384658	208	0.016083254	335	0.010421836	462	0.012293806
82	0.1245882	209	0.054443195	336	0.01171446	463	0.012012012
83	0.037216828	210	0.040053405	337	0.017539197	464	0.010316875
84	0.03721892	211	0.01848311	338	0.020553466	465	0.010819053
85	0.035102266	212	0.03138215	339	0.013768213	466	0.01481429
86	0.063561804	213	0.011653	340	0.026186362	467	0.019412382
87	0.018213866	214	0.015982721	341	0.016413292	468	0.014623172
88	0.058469763	215	0.027210884	342	0.018001324	469	0.015210006
89	0.070707071	216	0.01079062	343	0.011360669	470	0.017872082
90	0.038675652	217	0.029626449	344	0.010490869	471	0.016096429
91	0.040760037	218	0.01451131	345	0.025136046	472	0.015954671
92	0.022968198	219	0.018721077	346	0.015713388	473	0.0104
93	0.029498525	220	0.025448108	347	0.010545677	474	0.017130929
94	0.036962751	221	0.019308487	348	0.010444827	475	0.011873755
95	0.012571429	222	0.019823789	349	0.011317999	476	0.010950302
96	0.046092184	223	0.031168831	350	0.014545899	477	0.018482048
97	0.013977868	224	0.017737896	351	0.013964127	478	0.021865239
98	0.02039058	225	0.024288107	352	0.021914358	479	0.020305677
99	0.041936392	226	0.020867769	353	0.018856298	480	0.012354495
100	0.011021746	227	0.010616578	354	0.011370509	481	0.014012739
101	0.038151365	228	0.036363636	355	0.013623327	482	0.011446119
102	0.010231718	229	0.017419486	356	0.016841361	483	0.015869687
103	0.038427167	230	0.012524851	357	0.011673152	484	0.010280825
104	0.012480974	231	0.019393939	358	0.011848897	485	0.013163307
105	0.01295571	232	0.026724138	359	0.023557692	486	0.012494907
106	0.032421178	233	0.041370664	360	0.011589792	487	0.014703917
107	0.031879195	234	0.018406149	361	0.012104072	488	0.01437805
108	0.0275562	235	0.030859049	362	0.013014496	489	0.016328183
109	0.059171598	236	0.010313448	363	0.010193575	490	0.013941446
110	0.043025677	237	0.010445962	364	0.010152284	491	0.010723159
111	0.028392209	238	0.015568862	365	0.010405925	492	0.011474987
112	0.021508828	239	0.010083382	366	0.011702596	493	0.023495439
113	0.035279959	240	0.012285012	367	0.033170358	494	0.01951932
114	0.023507578	241	0.01016448	368	0.013841161	495	0.014138902
115	0.013388588	242	0.017304189	369	0.013243167	496	0.010329783
116	0.018244731	243	0.015064562	370	0.013718947	497	0.016472247
117	0.032437442	244	0.016129032	371	0.013737784	498	0.010712035
118	0.01044226	245	0.014296188	372	0.013005912	499	0.013466334
119	0.036474164	246	0.012591241	373	0.010500883	500	0.010806217
120	0.015321155	247	0.019368584	374	0.016336588	501	0.010598995

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
121	0.017707083	248	0.014068441	375	0.023770571	502	0.011887897
122	0.014038232	249	0.023735409	376	0.013614573	503	0.015096177
123	0.020913108	250	0.015110941	377	0.012914953	504	0.010397665
124	0.020252421	251	0.013302927	378	0.013745704	505	0.010116216
125	0.037643678	252	0.025708885	379	0.011344299	506	0.010897287
126	0.015218594	253	0.016926838	380	0.011874228	507	0.015113202
127	0.019570011	254	0.014794007	381	0.011978828	508	0.01408531

#### B. Data Ekstrem CAC 40

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
1	0.024520574	53	0.024089189	105	0.027298078	157	0.027683476
2	0.023646746	54	0.03107107	106	0.027087021	158	0.031595768
3	0.022283176	55	0.021797839	107	0.026569161	159	0.03097424
4	0.023655941	56	0.020433057	108	0.022993972	160	0.021947327
5	0.020001946	57	0.024378769	109	0.020890971	161	0.028935759
6	0.022932556	58	0.023123589	110	0.025360159	162	0.029875994
7	0.022143163	59	0.029008329	111	0.027214465	163	0.022407397
8	0.020219249	60	0.020771089	112	0.022899121	164	0.032742179
9	0.032701077	61	0.020759881	113	0.020237746	165	0.033226619
10	0.023378003	62	0.031520657	114	0.024225525	166	0.024605193
11	0.020165067	63	0.022962529	115	0.047504972	167	0.035034726
12	0.060070025	64	0.025904678	116	0.040684849	168	0.026039039
13	0.022232995	65	0.021381661	117	0.022783626	169	0.023087302
14	0.033743302	66	0.021093562	118	0.043845858	170	0.022739287
15	0.023898796	67	0.025974509	119	0.030562613	171	0.021045243
16	0.034201859	68	0.020456278	120	0.022697871	172	0.041439337
17	0.034911679	69	0.021421429	121	0.023893953	173	0.026230138
18	0.033764142	70	0.096592852	122	0.023582839	174	0.023081143
19	0.020474483	71	0.020818111	123	0.029345944	175	0.021482667
20	0.027608854	72	0.023204239	124	0.031401128	176	0.027242795
21	0.02469735	73	0.034242889	125	0.020612656	177	0.022033182
22	0.02226458	74	0.020271115	126	0.022478476	178	0.023060851
23	0.020216908	75	0.022395968	127	0.020871951	179	0.028422313
24	0.034198628	76	0.030524496	128	0.03584762	180	0.026808042
25	0.092729404	77	0.02988909	129	0.023698508	181	0.050136182
26	0.027286165	78	0.038114595	130	0.020883213	182	0.083894768
27	0.029639584	79	0.022499766	131	0.022064201	183	0.04468843
28	0.142304881	80	0.021201106	132	0.024477503	184	0.025106666
29	0.046815442	81	0.021189385	133	0.021000297	185	0.046108164
30	0.035613495	82	0.021530779	134	0.029234734	186	0.021198093

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
31	0.09234592	83	0.024252251	135	0.022549383	187	0.034217041
32	0.023255336	84	0.02473085	136	0.022179252	188	0.02547958
33	0.058507577	85	0.024571593	137	0.026692115	189	0.022171658
34	0.024170084	86	0.020372917	138	0.022107371	190	0.023959432
35	0.100945453	87	0.028861209	139	0.021925528	191	0.05159632
36	0.023525927	88	0.040205063	140	0.033458921	192	0.036377093
37	0.086837048	89	0.021556937	141	0.03585452	193	0.020196279
38	0.020717842	90	0.030705064	142	0.023669021	194	0.033630514
39	0.027600652	91	0.036262002	143	0.023719989	195	0.037073185
40	0.041204447	92	0.032714699	144	0.02479655	196	0.028394454
41	0.037285015	93	0.057369809	145	0.020946379	197	0.024851113
42	0.041116516	94	0.043272299	146	0.038053097	198	0.020273756
43	0.029037148	95	0.034120252	147	0.025479561	199	0.024132851
44	0.047417307	96	0.021291757	148	0.030658578	200	0.022784424
45	0.057313724	97	0.024176155	149	0.041382813	201	0.024020725
46	0.031796673	98	0.028297029	150	0.034909716	202	0.020349679
47	0.028099693	99	0.062783549	151	0.021706225	203	0.021091606
48	0.032360792	100	0.027287389	152	0.030690718	204	0.024401259
49	0.053686931	101	0.027583754	153	0.02568301	205	0.024396536
50	0.03132	102	0.067495033	154	0.035439398	206	0.075680111
51	0.021605863	103	0.042243226	155	0.022806772	207	0.020810586
52	0.024722652	104	0.024829707	156	0.025292671	208	0.020743402

### C. Data Ekstrem Dax

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
1	0.02244671	54	0.022855436	106	0.045473687	158	0.028838275
2	0.023844982	55	0.024160414	107	0.024222109	159	0.024064597
3	0.021268156	56	0.022189003	108	0.030904708	160	0.021542895
4	0.021905427	57	0.040831328	109	0.024420526	161	0.030676557
5	0.022870217	58	0.027375347	110	0.024498199	162	0.025680932
6	0.026393162	59	0.022740564	111	0.026536607	163	0.0265021
7	0.023305781	60	0.020130391	112	0.0208715	164	0.023354441
8	0.021367312	61	0.031909941	113	0.043312768	165	0.035057298
9	0.021587992	62	0.030689987	114	0.021458559	166	0.027109635
10	0.021924965	63	0.024547154	115	0.027540684	167	0.022655461
11	0.023120943	64	0.028559303	116	0.03929258	168	0.021846494
12	0.02318482	65	0.027752826	117	0.029095357	169	0.034331514
13	0.025534606	66	0.027009274	118	0.024934798	170	0.022389298
14	0.059302285	67	0.024470159	119	0.02185774	171	0.021158587
15	0.033261433	68	0.023954852	120	0.020931089	172	0.024974218

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
16	0.024860827	69	0.020747894	121	0.023223779	173	0.022774846
17	0.021187024	70	0.026779417	122	0.022667089	174	0.033730986
18	0.034144305	71	0.02055026	123	0.024083639	175	0.029042727
19	0.032392412	72	0.052986098	124	0.020169044	176	0.033698927
20	0.028364301	73	0.024144961	125	0.02113703	177	0.026278039
21	0.024135678	74	0.0311107936	126	0.020822449	178	0.020348614
22	0.026597667	75	0.025335625	127	0.020567078	179	0.028563341
23	0.022244248	76	0.023448335	128	0.020260951	180	0.022517042
24	0.055617689	77	0.026780386	129	0.020334986	181	0.036992406
25	0.024096241	78	0.020612064	130	0.024603425	182	0.109759
26	0.144109859	79	0.026633761	131	0.02023228	183	0.057675171
27	0.034290835	80	0.021959404	132	0.031151374	184	0.02794298
28	0.112768314	81	0.022765773	133	0.023262095	185	0.022438117
29	0.024371145	82	0.029815405	134	0.026210552	186	0.031474928
30	0.058153881	83	0.032821388	135	0.023932813	187	0.03133684
31	0.02594543	84	0.034510487	136	0.024628202	188	0.028910805
32	0.103435303	85	0.026878161	137	0.027935654	189	0.0250946
33	0.031173275	86	0.023944076	138	0.033560058	190	0.056731061
34	0.07632362	87	0.024970265	139	0.021954621	191	0.038900607
35	0.022389685	88	0.040731764	140	0.020502851	192	0.037493424
36	0.03385922	89	0.033646529	141	0.026573935	193	0.038771251
37	0.035398972	90	0.031468973	142	0.022359107	194	0.033556021
38	0.04517264	91	0.028761559	143	0.026451748	195	0.033943303
39	0.024331292	92	0.028672814	144	0.022342897	196	0.021266467
40	0.026932836	93	0.052918661	145	0.02400624	197	0.028374671
41	0.029739483	94	0.049134383	146	0.038079402	198	0.027094157
42	0.025066275	95	0.031467071	147	0.0215195	199	0.020442069
43	0.05424957	96	0.030232366	148	0.023178878	200	0.023638462
44	0.052802916	97	0.022073356	149	0.029029449	201	0.020747225
45	0.023001806	98	0.035460104	150	0.049716943	202	0.020059716
46	0.026452938	99	0.053485087	151	0.031827223	203	0.020733578
47	0.023946985	100	0.022473202	152	0.02684999	204	0.032212966
48	0.060722793	101	0.028085935	153	0.023243613	205	0.020057993
49	0.030565085	102	0.032247078	154	0.027672953	206	0.025508402
50	0.020612543	103	0.052688196	155	0.022225517	207	0.054734756
51	0.029991971	104	0.049816235	156	0.027396399	208	0.033060122
52	0.021083413	105	0.031093077	157	0.024796606	209	0.021155738
53	0.027885814						

D. Data Ekstrem Nikei 225

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
1	0.023146889	63	0.045519638	125	0.027136258	186	0.03234381
2	0.03584793	64	0.051544443	126	0.021296734	187	0.036771387
3	0.029603111	65	0.031798444	127	0.026365134	188	0.027035698
4	0.0261987	66	0.033925456	128	0.020260869	189	0.02153173
5	0.028234874	67	0.033201695	129	0.029889	190	0.02343895
6	0.033557904	68	0.029888338	130	0.022030046	191	0.023889109
7	0.025396831	69	0.044046225	131	0.027969478	192	0.039838527
8	0.030798074	70	0.037353047	132	0.023194211	193	0.024625024
9	0.020496197	71	0.039380658	133	0.035504511	194	0.024369949
10	0.025095367	72	0.045484376	134	0.029317559	195	0.02302958
11	0.022806102	73	0.027835848	135	0.022875779	196	0.067247773
12	0.030038654	74	0.020912811	136	0.020505439	197	0.025101065
13	0.026142386	75	0.021454942	137	0.049440375	198	0.024924264
14	0.025707203	76	0.023367047	138	0.027320384	199	0.023141364
15	0.036688241	77	0.027322029	139	0.02957299	200	0.032567213
16	0.024123067	78	0.033487293	140	0.035098101	201	0.026544258
17	0.024653852	79	0.029073359	141	0.020760504	202	0.022813771
18	0.023753806	80	0.024252226	142	0.025767368	203	0.021585759
19	0.020655354	81	0.038373585	143	0.024688419	204	0.02563716
20	0.020361787	82	0.024845815	144	0.032871498	205	0.021502272
21	0.020556511	83	0.027164968	145	0.025708948	206	0.038834596
22	0.040967607	84	0.027350962	146	0.02210072	207	0.024384558
23	0.029871094	85	0.022003391	147	0.029877175	208	0.026116981
24	0.026860468	86	0.020923985	148	0.024848541	209	0.021513033
25	0.042710253	87	0.023027257	149	0.021851608	210	0.021341065
26	0.02839216	88	0.021793234	150	0.022343618	211	0.021153366
27	0.030673796	89	0.032379716	151	0.021229258	212	0.025540828
28	0.024763984	90	0.024311132	152	0.022898876	213	0.023060328
29	0.021244229	91	0.027596928	153	0.020235448	214	0.023758136
30	0.042108308	92	0.027052902	154	0.025049932	215	0.020235163
31	0.029233055	93	0.022783084	155	0.026952315	216	0.071327928
32	0.023824142	94	0.027000525	156	0.021708755	217	0.080381005
33	0.020512986	95	0.020538486	157	0.031273983	218	0.038834483
34	0.030273249	96	0.0226028	158	0.02882449	219	0.042430039
35	0.027239659	97	0.021703082	159	0.030069004	220	0.020126661
36	0.029777311	98	0.028551793	160	0.02105231	221	0.021269484
37	0.021811869	99	0.020584664	161	0.020744407	222	0.031265958
38	0.02634444	100	0.056776386	162	0.023828704	223	0.031469895
39	0.023857625	101	0.027232965	163	0.039822488	224	0.027059532

No	Data Ekstrem	No	Data Ekstrem	No	Data EKstrem	No	Data Ekstrem
40	0.033755463	102	0.043616946	164	0.026444329	225	0.021369478
41	0.037561954	103	0.026398969	165	0.048253283	226	0.025632845
42	0.14150312	104	0.020119717	166	0.027337487	227	0.025529286
43	0.027826625	105	0.02252889	167	0.020474925	228	0.023207187
44	0.035861051	106	0.028160575	168	0.021813604	229	0.04882561
45	0.033385948	107	0.020354453	169	0.023206098	230	0.022158444
46	0.064082987	108	0.022965949	170	0.023901708	231	0.022357479
47	0.077405755	109	0.023007944	171	0.020689182	232	0.021155375
48	0.09959441	110	0.020144026	172	0.032017773	233	0.020525614
49	0.062681633	111	0.023647881	173	0.030250219	234	0.025001429
50	0.044614206	112	0.02140053	174	0.077088628	235	0.026592698
51	0.058071733	113	0.020009057	175	0.027010506	236	0.023604778
52	0.02715861	114	0.022012388	176	0.021123585	237	0.021171915
53	0.026969871	115	0.020020388	177	0.026069825	238	0.024079611
54	0.052224828	116	0.022021133	178	0.028844361	239	0.023839133
55	0.051978469	117	0.023923248	179	0.058765953	240	0.023187872
56	0.031488114	118	0.028179471	180	0.027232165	241	0.020916921
57	0.05206372	119	0.028621157	181	0.027981867	242	0.021030515
58	0.033833823	120	0.028790511	182	0.071557387	243	0.031173588
59	0.025779925	121	0.022751159	183	0.022760246	244	0.022497858
60	0.049326058	122	0.037732697	184	0.041095435	245	0.020480999
61	0.027273645	123	0.020945373	185	0.028403268	246	0.020560813
62	0.026505959	124	0.024291283				

#### Lampiran 4 Program Software R

```
#Statistikdeskriptif Return
> library(fBasics)
> summary(Return1);summary(Return2);summary(Return3);summary(Return4);
> skewness(Return1);skewness(Return2);skewness(Return3);skewness(Return4);
> var(Return1);var(Return2);var(Return3);var(Return4);
> stdev(Return1);stdev(Return2);stdev(Return3);stdev(Return4);
> kurtosis(Return1);kurtosis(Return2);kurtosis(Return3);kurtosis(Return4);
```

```
#Plot time series Return
> par(mfrow=c(2,2))
> plot.ts(Return1, xlab="Index", ylab="Return", main="Time Series Plot Return S&P500", col="#FA8072")
> plot.ts(Return2, xlab="Index", ylab="Return", main="Time Series Plot Return CAC40", col="#CCCCFF")
> plot.ts(Return3, xlab="Index", ylab="Return", main="Time Series Plot Return DAX", col="#9FE2BF")
> plot.ts(Return4, xlab="Index", ylab="Return", main="Time Series Plot Return NIKEI 225", col="#DFFF00")
```

```
#Histogram
```



```

> par(mfrow=c(2,2))
> hist(Return1,breaks=60, xlim=c(-0.1,0.15), ylim=c(0,1000),xlab="
Return",col="#FA8072", main="Histogram S&P 500")
> hist(Return2,breaks=60, xlim=c(-0.1,0.1), ylim=c(0,1000),xlab="
Return",col="#CCCCFF",main="Histogram CAC 40")
> hist(Return3,breaks=60, xlim=c(-0.1,0.1), ylim=c(0,1000),xlab="
Return",col="#9FE2BF",main="Histogram DAX")
> hist(Return4,breaks=60, xlim=c(-0.1,0.1), ylim=c(0,1000),xlab="
Return",col="#DFFF00",main="Histogram NIKEI 225")

```

```

#Identifikasi Nilai EKstrem

```

```

> par(mfrow=c(2,2))
> boxPlot(Return1,colour="Red")
> boxPlot(Return2,col="darkblue")
> boxPlot(Return3,col="Green")
> boxplot(Return4,col="Yellow")

```

```

#Nilai outlier pada data return

```

```

> nilai_outlier1=boxplot.stats(Return1)$out
> nilai_outlier2=boxplot.stats(Return2)$out
> nilai_outlier3=boxplot.stats(Return3)$out
> nilai_outlier4=boxplot.stats(Return4)$out

```

```

#Uji Normalitas Return

```

```

> library(nortest)
> #Uji Kolmogorov Smirnov Test
> lillie.test(POTT1)
> lillie.test(POTT2)
> lillie.test(POTT3)
> lillie.test(POTT3)
> qqnorm(Return1,col="#FA8072", main="Normal Q-Q Plot s&P 500")
> qqline(Return1)
> qqnorm(Return2,col="#CCCCFF",main="Normal Q-Q Plot CAC 40")
> qqline(Return2)
> qqnorm(Return3,col="#9FE2BF", main="Normal Q-Q Plot DAX")
> qqline(Return3)
> qqnorm(Return4,col="#DFFF00", main="Normal Q-Q Plot Nikei 225")
> qqline(Return4)

```

```

#EVT Model Peak Over Threshold

```

```

#Mean Residual Live Plot

```

```

> library(FExtremes)
> mrlPlot(Return1,ci=0.95)
> mrlPlot(Return2,ci=0.95)
> mrlPlot(Return3,ci=0.95)
> mrlPlot(Return4,ci=0.95)

```

```

#uji kesesuaian distribusi GPD menggunakan kolmogorof smirnov

```

```

> # Goodness of fit test
> library(EnvStats)
> gofTest(POTT1, distribution = "pareto",test = "ks")#Kolmogorov-
Smirnov
> gofTest(POTT2, distribution = "pareto",test = "ks")#Kolmogorov-
Smirnov
> gofTest(POTT3, distribution = "pareto",test = "ks")#Kolmogorov-
Smirnov
> gofTest(POTT4, distribution = "pareto",test = "ks")#Kolmogorov-
Smirnov

```

```

#Estimasi parameter GPD distribution dengan MLE

```

```

> library(eva)
> gpd1<- gpdFit(Return1, threshold=0.01,type="mle")
> gpd2<- gpdFit(Return2, threshold=0.02,type="mle")
> gpd3<- gpdFit(Return3, threshold=0.02,type="mle")
> gpd4<- gpdFit(Return4, threshold=0.02,type="mle")

```

```

#Value at risk POT
> #Return1
> n=3850
> nu1=508
> u1=0.01
> par.fitgpd1 = gpd1[["par.ests"]]
> scale.fit1 = gpd1[["par.ests"]][["Scale (Intercept)"]]
> shape.fit1 = gpd1[["par.ests"]][["Shape (Intercept)"]]
> VaRGP1 <- function(p){
+   VaR = u1 + ((scale.fit1/shape.fit1)*((n*(1-p)*(1/nu1))^(-shape.fit1)-1))
+   return(VaR)
+ }
> VaRGP1(0.95);VaRGP1(0.90);VaRGP1(0.99)

> #Return2
> n=3850
> nu2=208
> u2=0.02
> par.fitgpd2 = gpd2[["par.ests"]]
> scale.fit2= gpd2[["par.ests"]][["Scale (Intercept)"]]
> shape.fit2 = gpd2[["par.ests"]][["Shape (Intercept)"]]
> VaRGP2 <- function(p){
+   VaR = u2 + ((scale.fit2/shape.fit2)*((n*(1-p)*(1/nu2))^(-shape.fit2)-1))
+   return(VaR)
+ }
> VaRGP2(0.90);VaRGP2(0.95);VaRGP2(0.99)

> #Return3
> n=3850
> nu3=209
> u3=0.02
> par.fitgpd3 = gpd3[["par.ests"]]
> scale.fit3= gpd3[["par.ests"]][["Scale (Intercept)"]]
> shape.fit3 = gpd3[["par.ests"]][["Shape (Intercept)"]]
> VaRGP3 <- function(p){
+   VaR = u3 + ((scale.fit3/shape.fit3)*((n*(1-p)*(1/nu3))^(-shape.fit3)-1))
+   return(VaR)
+ }
> VaRGP3(0.90);VaRGP3(0.95);VaRGP3(0.99)

#Return4
> n=3850
> nu4=246
> u4=0.02
> par.fitgpd4 = gpd4[["par.ests"]]
> scale.fit4= gpd4[["par.ests"]][["Scale (Intercept)"]]
> shape.fit4 = gpd4[["par.ests"]][["Shape (Intercept)"]]
> VaRGP4 <- function(p){
+   VaR = u4 + ((scale.fit4/shape.fit4)*((n*(1-p)*(1/nu4))^(-shape.fit4)-1))
+   return(VaR)
+ }
> VaRGP4(0.90);VaRGP4(0.95);VaRGP4(0.99)

#ESTIMASI TVAR dengan POT
#Return1
TVaR1 <- function(p){
TVaR=u1+(scale.fit1/shape.fit1)*((n/nu1)^(-shape.fit1))*((1/(1-shape.fit1))*((1-p)^(-(shape.fit1)))-(scale.fit1/shape.fit1))

```

```

return(TVaR)
}
TVaR1(0.95);TVaR1(0.99);TVaR1(0.90)
#Return2
TVaR2 <- function(p){
  TVaR=u2+(scale.fit2/shape.fit2)*((n/nu2)^(-shape.fit2))*((1/(1-
shape.fit2))*((1-p)^-(shape.fit2)))-(scale.fit2/shape.fit2)
  return(TVaR)
}
TVaR2(0.95);TVaR2(0.99);TVaR2(0.90)

#Return3
TVaR3<- function(p){
  TVaR=u3+(scale.fit3/shape.fit3)*((n/nu3)^(-shape.fit3))*((1/(1-
shape.fit3))*((1-p)^-(shape.fit3)))-(scale.fit3/shape.fit3)
  return(TVaR)
}
TVaR3(0.95);TVaR3(0.99);TVaR3(0.90)

#Return4
TVaR4<- function(p){
  TVaR=u4+(scale.fit4/shape.fit4)*((n/nu4)^(-shape.fit4))*((1/(1-
shape.fit4))*((1-p)^-(shape.fit4)))-(scale.fit4/shape.fit4)
  return(TVaR)
}
TVaR4(0.95);TVaR4(0.99);TVaR4(0.90)

#Estimasi Adj-TVAR Dengan POT
#Return1
ADJTVaR1 <- function(p,c){
  ADJTVaR=u1+((scale.fit1/shape.fit1)*((n*(1-p)/nu1)^(-shape.fit1
)))*(((1-((1-p)^(c))))^(-shape.fit1+1))-1)*(1/((1-p)^c))*(1/(shape.
fit1-1)))-(scale.fit1/shape.fit1)
  return(ADJTVaR)
}

ADJTVaR1(0.90,0.01);ADJTVaR1(0.90,0.05);ADJTVaR1(0.90,0.1)
ADJTVaR1(0.95,0.01);ADJTVaR1(0.95,0.05);ADJTVaR1(0.95,0.1)
ADJTVaR1(0.99,0.01);ADJTVaR1(0.99,0.05);ADJTVaR1(0.99,0.1)

#Return2
ADJTVaR2 <- function(p,c){
  ADJTVaR=u2+((scale.fit2/shape.fit2)*((n*(1-p)/nu2)^(-shape.fit2
)))*(((1-((1-p)^(c))))^(-shape.fit2+1))-1)*(1/((1-p)^c))*(1/(shape.
fit2-1)))-(scale.fit2/shape.fit2)
  return(ADJTVaR)
}

ADJTVaR2(0.95,0.01);ADJTVaR2(0.95,0.1);ADJTVaR2(0.95,0.05)
ADJTVaR2(0.90,0.01);ADJTVaR2(0.90,0.1);ADJTVaR2(0.90,0.05)
ADJTVaR2(0.99,0.01);ADJTVaR2(0.99,0.1);ADJTVaR2(0.99,0.05)

#Return3
ADJTVaR3 <- function(p,c){
  ADJTVaR=u3+((scale.fit3/shape.fit3)*((n*(1-p)/nu3)^(-shape.fit3
)))*(((1-((1-p)^(c))))^(-shape.fit3+1))-1)*(1/((1-p)^c))*(1/(shape.
fit3-1)))-(scale.fit3/shape.fit3)
  return(ADJTVaR)
}

ADJTVaR3(0.95,0.01);ADJTVaR3(0.95,0.1);ADJTVaR3(0.95,0.05)
ADJTVaR3(0.90,0.01);ADJTVaR3(0.90,0.1);ADJTVaR3(0.90,0.05)
ADJTVaR3(0.99,0.01);ADJTVaR3(0.99,0.1);ADJTVaR3(0.99,0.05)

#Return4
ADJTVaR4<- function(p,c){

```

```
ADJTVaR=u4+((scale.fit4/shape.fit4)*((n*(1-p)/nu4)^(-shape.fit4
))*(((1-((1-p)^(c))))^(-shape.fit4+1))-1)*(1/((1-p)^c))*(1/(shape.
fit4-1)))-(scale.fit4/shape.fit4)
return(ADJTVaR)
}
```

```
ADJTVaR4(0.95,0.01);ADJTVaR4(0.95,0.1);ADJTVaR4(0.95,0.05)
ADJTVaR4(0.90,0.01);ADJTVaR4(0.90,0.1);ADJTVaR4(0.90,0.05)
ADJTVaR4(0.99,0.01);ADJTVaR4(0.99,0.1);ADJTVaR4(0.99,0.05)
```