

Results are obtained with  $h_0^P$  estimated

CALIBRATED PARAMETERS ON WEDNESDAYS USING OPTIONS LIKELIHOOD, $h_0^Q = h_t^P$									
$\theta$	2010	2011	2012	2013	2014	2015	2016	2017	2018
$\omega$	$2.9373e-07$	$8.3428e-06$	$2.0557e-09$	$1.4603e-06$	$1.9938e-06$	$4.7113e-07$	$6.9592e-07$	$3.5608e-07$	$2.8373e-07$
<b>std</b>	$(1.5899e-06)$	$(2.7177e-05)$	$(4.0487e-09)$	$(4.9823e-06)$	$(6.7867e-06)$	$(2.5578e-06)$	$(3.0411e-06)$	$(2.0030e-06)$	$(1.8910e-06)$
<b>median</b>	$4.4080e-10$	$2.1679e-09$	$1.1257e-09$	$1.5347e-09$	$1.3127e-09$	$1.3856e-09$	$7.3148e-10$	$2.7972e-10$	$4.9914e-10$
$\alpha$	$2.6506e-05$	$2.2808e-05$	$2.0436e-05$	$1.5988e-05$	$1.4776e-05$	$1.3678e-05$	$1.3866e-05$	$9.2340e-06$	$1.6279e-05$
<b>std</b>	$(2.1430e-05)$	$(2.2449e-05)$	$(1.7810e-05)$	$(1.2247e-05)$	$(9.2665e-06)$	$(6.8892e-06)$	$(8.7406e-06)$	$(4.9557e-06)$	$(1.1036e-05)$
<b>median</b>	$2.1958e-05$	$2.0325e-05$	$1.4954e-05$	$1.5884e-05$	$1.4270e-05$	$1.2722e-05$	$1.2912e-05$	$9.1517e-06$	$1.5918e-05$
$\beta$	0.4708	0.3164	0.4553	0.3331	0.1703	0.1908	0.2374	0.1474	0.2896
<b>std</b>	$(0.3272)$	$(0.3221)$	$(0.3657)$	$(0.3768)$	$(0.2815)$	$(0.2349)$	$(0.3108)$	$(0.2931)$	$(0.3377)$
<b>median</b>	0.5549	0.3131	0.6192	0.0023	0.0002	0.0090	0.0007	0.0001	0.0010
$\gamma^*$	155.5027	256.7574	176.9894	247.3834	225.9295	224.0573	257.7868	275.5854	191.7579
<b>std</b>	$(149.9840)$	$(289.5641)$	$(121.4388)$	$(267.6261)$	$(201.9510)$	$(48.8853)$	$(247.1550)$	$(187.7364)$	$(108.0334)$
<b>median</b>	115.7838	148.3374	137.7486	166.2098	189.4759	226.1581	205.5256	237.1314	159.7501
$h_0^Q = h_t^P$	$1.2843e-04$	$1.5885e-04$	$8.8858e-05$	$6.0313e-05$	$6.5265e-05$	$1.1085e-04$	$9.9075e-05$	$4.0828e-05$	$1.1258e-04$
<b>std</b>	$(8.7675e-05)$	$(1.0228e-04)$	$(4.2482e-05)$	$(3.1009e-05)$	$(3.7863e-05)$	$(6.5832e-05)$	$(7.2668e-05)$	$(2.3485e-05)$	$(8.8642e-05)$
<b>median</b>	$1.1288e-04$	$1.3446e-04$	$8.4289e-05$	$4.8973e-05$	$5.5260e-05$	$9.2823e-05$	$7.8758e-05$	$3.3053e-05$	$9.1614e-05$
<b>persistence</b>	0.8296	0.8243	0.7887	0.7028	0.6687	0.7948	0.7570	0.6523	0.6896
<b>std</b>	$(0.1480)$	$(0.1406)$	$(0.2140)$	$(0.2369)$	$(0.2103)$	$(0.0995)$	$(0.1568)$	$(0.2196)$	$(0.2197)$
<b>median</b>	0.8790	0.8230	0.8761	0.7046	0.6817	0.7949	0.7223	0.6810	0.7138
<b>MSE</b>	1.3115	4.7861	2.6162	4.2244	8.4450	6.3652	10.9788	23.0601	13.4936
<b>IVRMSE</b>	0.0639	0.0955	0.0867	0.0890	0.0933	0.0939	0.1111	0.1248	0.0897
<b>MAPE</b>	0.0741	0.0936	0.1184	0.1292	0.1568	0.1523	0.1709	0.2464	0.1414
<b>OptLL</b>	215.4291	208.3681	251.0076	333.0039	351.3072	436.8099	513.2066	555.4006	684.7143

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CALIBRATED PARAMETERS ON WEDNESDAYS, $h_0^Q = \frac{\omega_0 + \alpha_0}{1 - \beta_0 - \alpha_0 \gamma_0^{*2}}$ , WITH $\omega_0, \alpha_0, \beta_0, \gamma_0^{*2}$ FROM MLE UNDER P AND UPDATED UNDER Q									
$\theta$	2010	2011	2012	2013	2014	2015	2016	2017	2018
$\omega$	$8.5029e-08$	$9.2714e-06$	$1.9246e-07$	$2.2129e-06$	$1.9389e-06$	$4.1610e-07$	$5.9987e-07$	$3.5299e-07$	$5.5812e-07$
std	$(4.4877e-07)$	$(2.7968e-05)$	$(1.0856e-06)$	$(6.4184e-06)$	$(6.6239e-06)$	$(2.4952e-06)$	$(2.9189e-06)$	$(2.0142e-06)$	$(2.7146e-06)$
median	$4.8556e-10$	$1.1932e-09$	$9.6775e-10$	$1.6296e-09$	$1.4218e-09$	$1.6699e-09$	$8.8906e-10$	$3.4979e-10$	$6.2288e-10$
$\alpha$	$2.5394e-05$	$2.1003e-05$	$1.8778e-05$	$1.3908e-05$	$1.3646e-05$	$1.3883e-05$	$1.3858e-05$	$8.2692e-06$	$1.5954e-05$
std	$(2.2029e-05)$	$(2.0947e-05)$	$(1.6410e-05)$	$(1.1489e-05)$	$(8.5375e-06)$	$(5.9109e-06)$	$(8.0356e-06)$	$(4.8704e-06)$	$(9.4418e-06)$
median	$1.7658e-05$	$1.9181e-05$	$1.2068e-05$	$1.2723e-05$	$1.3239e-05$	$1.3217e-05$	$1.3228e-05$	$8.3302e-06$	$1.4242e-05$
$\beta$	0.5032	0.3363	0.4882	0.3724	0.1836	0.1643	0.2466	0.1768	0.2450
std	(0.3188)	(0.3212)	(0.3411)	(0.3801)	(0.2898)	(0.2274)	(0.3159)	(0.3270)	(0.3193)
median	0.5759	0.3823	0.5857	0.3025	0.0003	0.0007	0.0018	0.0001	0.0023
$\gamma^*$	152.7405	213.9027	178.3425	268.5595	254.9716	221.9130	209.9787	301.8938	202.9867
std	(136.5742)	(168.6915)	(140.6359)	(295.7190)	(239.7515)	(41.5011)	(73.9368)	(189.9283)	(132.2615)
median	112.0207	155.9251	147.8898	169.4020	202.0041	228.8470	208.6253	261.8796	167.7543
$h_0^Q = h_t^P$	$1.2504e-04$	$1.6094e-04$	$8.8020e-05$	$6.3516e-05$	$6.4968e-05$	$1.0677e-04$	$9.4593e-05$	$4.2065e-05$	$1.2042e-04$
std	$(8.4350e-05)$	$(1.0127e-04)$	$(3.9993e-05)$	$(3.0169e-05)$	$(3.7802e-05)$	$(5.3934e-05)$	$(6.6163e-05)$	$(2.5624e-05)$	$(9.2499e-05)$
median	$1.0398e-04$	$1.3887e-04$	$7.9893e-05$	$5.2671e-05$	$5.4472e-05$	$8.9209e-05$	$6.9330e-05$	$3.6036e-05$	$1.0226e-04$
persistence	0.8400	0.8357	0.8048	0.7215	0.6850	0.7899	0.7567	0.6880	0.6960
std	(0.1471)	(0.1267)	(0.2039)	(0.2405)	(0.2211)	(0.0938)	(0.1574)	(0.2170)	(0.1905)
median	0.8873	0.8444	0.8985	0.7596	0.7232	0.7879	0.7342	0.7017	0.7484
MSE	1.1660	4.6442	2.4437	4.3159	7.5939	6.1701	10.7231	20.7106	13.3130
IVRMSE	0.0633	0.0921	0.0863	0.0894	0.0927	0.0927	0.1089	0.1237	0.0887
MAPE	0.0734	0.0906	0.1179	0.1315	0.1531	0.1484	0.1669	0.2416	0.1395
OptLL	216.3430	211.5388	252.2146	334.4711	356.0208	438.7128	515.4908	559.3221	688.0683

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CALIBRATED PARAMETERS ON WEDNESDAYS USING OPTIONS LIKELIHOOD, $h_0^Q$ IS REALIZED VOLATILITY									
$\theta$	2010	2011	2012	2013	2014	2015	2016	2017	2018
$\omega$	$4.4390e-06$	$1.6421e-05$	$1.2371e-06$	$2.3916e-06$	$1.6398e-06$	$1.0287e-06$	$1.3292e-06$	$1.7818e-07$	$5.5739e-06$
<b>std</b>	$(2.1202e-05)$	$(3.7688e-05)$	$(4.8847e-06)$	$(6.4010e-06)$	$(5.4933e-06)$	$(3.6010e-06)$	$(3.7767e-06)$	$(9.9009e-07)$	$(2.3025e-05)$
<b>median</b>	$7.1991e-10$	$2.7245e-09$	$1.0594e-09$	$3.2019e-09$	$8.7991e-10$	$1.5623e-09$	$1.0905e-09$	$2.9135e-10$	$8.2769e-10$
$\alpha$	$3.6449e-05$	$3.0352e-05$	$2.6117e-05$	$1.0640e-05$	$1.3074e-05$	$1.1916e-05$	$1.3060e-05$	$4.4963e-06$	$1.2185e-05$
<b>std</b>	$(2.8777e-05)$	$(2.8048e-05)$	$(2.0832e-05)$	$(1.0869e-05)$	$(1.3823e-05)$	$(1.0055e-05)$	$(1.1191e-05)$	$(5.0144e-06)$	$(1.3058e-05)$
<b>median</b>	$2.7865e-05$	$2.0508e-05$	$1.8591e-05$	$7.1029e-06$	$7.8547e-06$	$8.9842e-06$	$8.6525e-06$	$3.1924e-06$	$9.4728e-06$
$\beta$	0.4154	0.3178	0.4034	0.5183	0.4359	0.3807	0.3932	0.5989	0.4758
<b>std</b>	(0.3534)	(0.3373)	(0.3495)	(0.3480)	(0.3691)	(0.3181)	(0.3109)	(0.3133)	(0.3576)
<b>median</b>	0.5079	0.2049	0.4684	0.6798	0.5937	0.5059	0.4466	0.7443	0.6481
$\gamma^*$	122.4610	172.1046	148.9414	316.1972	260.0664	244.0577	251.5891	307.1280	256.7916
<b>std</b>	(110.7548)	(153.0932)	(118.6459)	(375.3863)	(259.3262)	(132.3480)	(243.2757)	(172.5592)	(228.0918)
<b>median</b>	100.2388	132.6313	126.5910	161.2021	177.3985	221.2115	194.6935	287.6256	179.1764
$h_0^Q = h_t^P$	$8.6011e-05$	$1.5683e-04$	$5.7150e-05$	$4.7600e-05$	$4.2269e-05$	$7.3948e-05$	$5.8848e-05$	$1.2876e-05$	$5.7619e-05$
<b>std</b>	$(7.7213e-05)$	$(2.4253e-04)$	$(4.8172e-05)$	$(5.7769e-05)$	$(7.5395e-05)$	$(1.1377e-04)$	$(8.1886e-05)$	$(7.9046e-06)$	$(5.6720e-05)$
<b>median</b>	$6.0175e-05$	$6.9450e-05$	$4.1358e-05$	$3.3327e-05$	$2.2715e-05$	$4.5815e-05$	$2.6906e-05$	$1.1264e-05$	$3.6139e-05$
<b>persistence</b>	0.7734	0.7755	0.7364	0.7961	0.7722	0.8342	0.8109	0.8913	0.7686
<b>std</b>	(0.1713)	(0.1684)	(0.2286)	(0.2241)	(0.2091)	(0.1443)	(0.1603)	(0.1272)	(0.2378)
<b>median</b>	0.8329	0.8363	0.8267	0.8976	0.8578	0.8858	0.8608	0.9436	0.8548
<b>MSE</b>	1.7891	5.3716	2.5919	3.0224	4.9591	3.6728	4.0827	4.0435	14.2469
<b>IVRMSE</b>	0.0710	0.1004	0.0897	0.0873	0.0936	0.0975	0.1014	0.1046	0.0966
<b>MAPE</b>	0.0802	0.1010	0.1322	0.1310	0.1535	0.1631	0.1585	0.1894	0.1503
<b>OptLL</b>	211.2856	207.1647	247.0419	341.4580	363.2253	438.8849	538.5336	625.4260	679.0972

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CALIBRATED PARAMETERS ON WEDNESDAYS, $h_0^Q$ IS CALIBRATED WITH RESPECT TO OPTIONS LIKELIHOOD									
$\theta$	2010	2011	2012	2013	2014	2015	2016	2017	2018
$\omega$	$4.2779e-09$	$3.2992e-07$	$3.3648e-08$	$3.8491e-07$	$1.2743e-07$	$4.4951e-08$	$2.5272e-08$	$3.9321e-08$	$3.7781e-08$
<b>std</b>	$(1.6791e-08)$	$(1.5604e-06)$	$(1.6574e-07)$	$(1.3052e-06)$	$(4.5655e-07)$	$(2.0855e-07)$	$(1.4770e-07)$	$(1.7009e-07)$	$(2.2443e-07)$
<b>median</b>	$5.6987e-10$	$1.1448e-09$	$8.8539e-10$	$1.3899e-09$	$7.7997e-10$	$1.5014e-09$	$9.8128e-10$	$4.0373e-10$	$7.1023e-10$
$\alpha$	$1.8528e-05$	$1.6271e-05$	$9.0589e-06$	$6.1070e-06$	$7.6946e-06$	$7.2374e-06$	$5.1346e-06$	$2.3951e-06$	$1.3159e-05$
<b>std</b>	$(1.9304e-05)$	$(2.1985e-05)$	$(1.2012e-05)$	$(7.9519e-06)$	$(9.6389e-06)$	$(7.2754e-06)$	$(5.8307e-06)$	$(3.0938e-06)$	$(1.6443e-05)$
<b>median</b>	$1.0906e-05$	$7.6580e-06$	$4.5292e-06$	$3.1281e-06$	$3.2390e-06$	$4.3350e-06$	$2.9817e-06$	$1.4483e-06$	$4.5077e-06$
$\beta$	0.6378	0.5560	0.7245	0.7258	0.6358	0.5520	0.6269	0.7263	0.5387
<b>std</b>	(0.2696)	(0.2971)	(0.2146)	(0.2478)	(0.2979)	(0.2466)	(0.2257)	(0.2586)	(0.3753)
<b>median</b>	0.7368	0.6567	0.8002	0.8149	0.7673	0.6572	0.6945	0.8054	0.7356
$\gamma^*$	134.9727	191.7168	186.9011	254.4028	276.4433	280.6426	298.3299	331.9039	243.3202
<b>std</b>	(47.8695)	(93.1766)	(76.3909)	(194.7410)	(232.3643)	(175.7277)	(157.3293)	(112.0556)	(122.2386)
<b>median</b>	128.3648	175.8916	175.0860	184.1932	222.8042	257.4585	297.1472	333.3806	221.0610
$h_0^Q$	$1.3056e-04$	$2.2460e-04$	$8.4830e-05$	$4.8801e-05$	$4.8652e-05$	0.0001	$7.5242e-05$	$1.9048e-05$	$1.3485e-04$
<b>std</b>	$(1.3959e-04)$	$(2.3120e-04)$	$(5.7765e-05)$	$(4.5932e-05)$	$(5.7911e-05)$	$(1.1307e-04)$	$(1.0294e-04)$	$(1.9023e-05)$	$(1.7128e-04)$
<b>median</b>	$9.1311e-05$	$1.1465e-04$	$6.1522e-05$	$3.3426e-05$	$2.7470e-05$	$5.5238e-05$	$3.7873e-05$	$1.3922e-05$	$4.6996e-05$
<b>persistence</b>	0.8865	0.9140	0.9172	0.9104	0.8914	0.9184	0.9374	0.9523	0.8261
<b>std</b>	(0.1325)	(0.0899)	(0.1260)	(0.1125)	(0.1276)	(0.0760)	(0.0690)	(0.0709)	(0.2077)
<b>median</b>	0.9423	0.9529	0.9643	0.9574	0.9469	0.9499	0.9650	0.9764	0.9464
<b>MSE</b>	0.6499	1.0486	1.0785	0.7407	1.1260	1.2960	1.6303	1.7009	4.5699
<b>IVRMSE</b>	0.0565	0.0656	0.0812	0.0793	0.0798	0.0918	0.0991	0.0994	0.0797
<b>MAPE</b>	0.0672	0.0724	0.1105	0.1056	0.1224	0.1361	0.1324	0.1677	0.1248
<b>OptLL</b>	226.1068	234.9978	265.1968	365.6016	393.4111	469.1520	576.9261	651.9071	731.5026