MA374 Financial Engineering Lab
Assignment - 8

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Question - 1
Part - (a)

The historical volatility was estimated by calculating the standard deviation of ***the log of the ratio of successive stock pices*** *for the specified duration and mulltiplying it by a factor of* $\sqrt{(252)}$ *in order to convert into annual terms. The screenshot of the values of historical volati lity on the basis of the last 1 month prices are shown below:-*

For bsedata1.csv

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For bsedata1.csv


          Stock  Historical Volatility
0        ^BSESN               0.142612
1       INFY.BO               0.205924
2   RELIANCE.BO               0.166238
3   HDFCBANK.BO               0.191000
4   AXISBANK.BO               0.247508
5 BHARTIARTL.BO               0.167933
6  ICICIBANK.BO               0.218732
7       VEDL.BO               0.325821
8      CIPLA.BO               0.208404
9        TCS.BO               0.220531
10 NESTLEIND.BO               0.171220
11     TITAN.BO               0.186944
12      IDBI.BO               0.635812
13   TVSMOTOR.BO              0.306516
14   BOSCHLTD.BO              0.222103
15      GAIL.BO               0.267733
16   YESBANK.BO               0.968306
17    VOLTAS.BO               0.225468
18    MARICO.BO               0.208382
19 UNIONBANK.BO               1.052426
20    NAUKRI.BO               0.275741
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For nsedata1.csv

For nsedata1.csv

	Stock	Historical Volatility
0	^NSEI	0.132233
1	UPL.NS	0.250241
2	ICICIBANK.NS	0.184463
3	WIPRO.NS	0.183749
4	TECHM.NS	0.258003
5	ASIANPAINT.NS	0.150788
6	EICHERMOT.NS	0.269147
7	NTPC.NS	0.189802
8	LT.NS	0.197612
9	COALINDIA.NS	0.219969
10	GRASIM.NS	0.178750
11	BHEL.NS	0.490927
12	DABUR.NS	0.186073
13	COLPAL.NS	0.219244
14	MRF.NS	0.176347
15	GAIL.NS	0.265362
16	HAVELLS.NS	0.204287
17	POONAWALLA.NS	0.616415
18	BOSCHLTD.NS	0.186690
19	UNIONBANK.NS	0.974452
20	GODREJCP.NS	0.207060

Part - (b)

In order to calculate the cost of call and put option using the classical BSM framework, I used the below relations:-

$$C(t,s)=sN(d_1)-ke^{-r\tau}N(d_2)$$

$$d_1=\frac{1}{\sigma\sqrt{(\tau)}}(\log(\frac{s}{k})+(r+\sigma^2/2)\tau)$$

$$d2=d1-\sigma\sqrt{(\tau)}$$

$$\tau=T-t$$

$$N(x)=\frac{1}{\sqrt{2\Pi}}\int_{-\infty}^{x}e^{-\frac{x^2}{2}}$$

Now from the above relations we can calculate the price of a European Call option in the classical BSM framework. For put option we use the put-call parity:-

$$C(t,s)-P(t,s)=s-Ke^{-r\tau}$$

Note that, the parameter σ is estimated as the historical volatility calculated earlier.

Below is the screenshot of the tabulated prices of call and put option of all the index and non index stocks considered for different values of the parameter A.

For ^BSESN

	A	Call Prices	Put Prices
0	0.5	31421.691258	3.165042e-10
1	0.6	25440.197523	4.490536e-05
2	0.7	19458.796349	9.265087e-02
3	0.8	13489.554161	1.234424e+01
4	0.9	7763.391885	2.676757e+02
5	1.0	3267.301056	1.753079e+03
6	1.1	918.899461	5.386171e+03
7	1.2	170.585309	1.061935e+04
8	1.3	21.730549	1.645199e+04
9	1.4	2.009514	2.241376e+04
10	1.5	0.142688	2.839339e+04

For INFY.BO

	A	Call Prices	Put Prices
0	0.5	781.403068	0.000012
1	0.6	632.658439	0.004776
2	0.7	484.154738	0.250469
3	0.8	338.699019	3.544143
4	0.9	207.449250	21.043768
5	1.0	107.536319	69.880230
6	1.1	46.663442	157.756747
7	1.2	17.104465	276.947164
8	1.3	5.400791	413.992884
9	1.4	1.502662	558.844149
10	1.5	0.376525	706.467405

For RELIANCE.BO

	A	Call Prices	Put Prices
0	0.5	1304.942827	1.627131e-08
1	0.6	1056.531512	1.191113e-04
2	0.7	808.158360	3.840235e-02
3	0.8	561.365582	1.657058e+00
4	0.9	330.183596	1.888651e+01
5	1.0	151.994758	8.910910e+01
6	1.1	52.416173	2.379420e+02
7	1.2	13.567385	4.475046e+02
8	1.3	2.714041	6.850627e+02
9	1.4	0.436010	9.311961e+02
10	1.5	0.058425	1.179230e+03

For HDFCBANK.BO

	A	Call Prices	Put Prices
0	0.5	842.039081	0.000001
1	0.6	681.748294	0.001398
2	0.7	521.582334	0.127622
3	0.8	363.704667	2.542139
4	0.9	219.348381	18.478037
5	1.0	109.171955	68.593796
6	1.1	43.979552	163.693576
7	1.2	14.450436	294.456645
8	1.3	3.961010	444.259402
9	1.4	0.930811	601.521387
10	1.5	0.192556	761.075317

For AXISBANK.BO

	A	Call Prices	Put Prices
0	0.5	483.141893	0.000516
1	0.6	391.208270	0.038618
2	0.7	299.899458	0.701531
3	0.8	212.351144	5.124941
4	0.9	135.671917	20.417439
5	1.0	77.246369	53.963616
6	1.1	39.217688	107.906659
7	1.2	17.925394	178.586090
8	1.3	7.477854	260.110275
9	1.4	2.888523	347.492668
10	1.5	1.047198	437.623068

For BHARTIARTL.BO

	A	Call Prices	Put Prices
0	0.5	421.480663	7.869971e-09
1	0.6	341.246839	4.874963e-05
2	0.7	261.027080	1.416161e-02
3	0.8	181.352469	5.734227e-01
4	0.9	106.845408	6.300234e+00
5	1.0	49.471614	2.916031e+01
6	1.1	17.270455	7.719303e+01
7	1.2	4.557128	1.447136e+02
8	1.3	0.935357	2.213257e+02
9	1.4	0.155031	3.007792e+02
10	1.5	0.021531	3.808796e+02

For ICICIBANK.BO

	A	Call Prices	Put Prices
0	0.5	465.234944	0.000033
1	0.6	376.679112	0.007216
2	0.7	288.365164	0.256284
3	0.8	202.393322	2.847458
4	0.9	125.613991	14.631141
5	1.0	67.211848	44.792014
6	1.1	30.819119	96.962300
7	1.2	12.227169	166.933366
8	1.3	4.271073	247.540285
9	1.4	1.339499	333.171726
10	1.5	0.384273	420.779515

For VEDL.BO

	A	Call Prices	Put Prices
0	0.5	158.070841	0.012395
1	0.6	128.153717	0.183582
2	0.7	99.068720	1.186896
3	0.8	72.281221	4.487707
4	0.9	49.532794	11.827592
5	1.0	31.915175	24.298282
6	1.1	19.435397	41.906815
7	1.2	11.266954	63.826684
8	1.3	6.265604	88.913645
9	1.4	3.366797	116.103148
10	1.5	1.759485	144.584147

For CIPLA.BO

	A	Call Prices	Put Prices
0	0.5	558.532974	0.000012
1	0.6	452.213688	0.004138
2	0.7	346.086266	0.200129
3	0.8	242.256051	2.693327
4	0.9	148.760675	15.521363
5	1.0	77.605418	50.689518
6	1.1	34.056373	113.463886
7	1.2	12.688249	198.419174
8	1.3	4.090853	296.145190
9	1.4	1.166786	399.544536
10	1.5	0.300688	505.001851

For TCS.BO

	A	Call Prices	Put Prices
0	0.5	1683.053617	0.000147
1	0.6	1362.693576	0.029413
2	0.7	1043.269024	0.994166
3	0.8	732.596241	10.710690
4	0.9	455.521232	54.024987
5	1.0	244.768615	163.661676
6	1.1	113.046301	352.328668
7	1.2	45.309875	604.981548
8	1.3	16.033198	896.094177
9	1.4	5.105737	1205.556022
10	1.5	1.490166	1522.329758

For NESTLEIND.BO

For NESTLEIND.BO

	A	Call Prices	Put Prices
0	0.5	10155.729480	4.017984e-07
1	0.6	8222.467045	1.825461e-03
2	0.7	6289.637940	4.369809e-01
3	0.8	4371.658247	1.572155e+01
4	0.9	2583.999225	1.613268e+02
5	1.0	1209.768549	7.203604e+02
6	1.1	432.141895	1.875998e+03
7	1.2	118.199912	3.495320e+03
8	1.3	25.450395	5.335835e+03
9	1.4	4.470477	7.248119e+03
10	1.5	0.663521	9.177577e+03

For TITAN.BO

	A	Call Prices	Put Prices
0	0.5	1314.165039	0.000001
1	0.6	1063.999503	0.001457
2	0.7	813.989268	0.158215
3	0.8	567.170400	3.506339
4	0.9	340.631195	27.134127
5	1.0	167.542502	104.212427
6	1.1	65.997933	252.834850
7	1.2	20.968840	457.972749
8	1.3	5.501283	692.672185
9	1.4	1.226524	938.564418
10	1.5	0.238988	1187.743875

For IDBI.BO

	A	Call Prices	Put Prices
0	0.5	28.237669	0.391716
1	0.6	23.593596	1.048453
2	0.7	19.435345	2.191011
3	0.8	15.825276	3.881752
4	0.9	12.769194	6.126478
5	1.0	10.232818	8.890911
6	1.1	8.159464	12.118367
7	1.2	6.483831	15.743543
8	1.3	5.140976	19.701498
9	1.4	4.071327	23.932657
10	1.5	3.222898	28.385038

For TVSMOTOR.BO

	A	Call Prices	Put Prices
0	0.5	568.543898	0.020207
1	0.6	460.698220	0.399796
2	0.7	355.186937	3.113780
3	0.8	257.125786	13.277896
4	0.9	173.419529	37.796905
5	1.0	108.902739	81.505382
6	1.1	63.987892	144.815802
7	1.2	35.455534	224.508711
8	1.3	18.689672	315.968115
9	1.4	9.452235	414.955946
10	1.5	4.621751	518.350728

For BOSCHLTD.BO

	A	Call Prices	Put Prices
0	0.5	8820.943467	0.000913
1	0.6	7141.941638	0.170730
2	0.7	5468.131051	5.531789
3	0.8	3841.475255	58.047638
4	0.9	2392.443268	288.187296
5	1.0	1290.262300	865.177974
6	1.1	599.606360	1853.693680
7	1.2	242.438478	3175.697443
8	1.3	86.743483	4699.174094
9	1.4	27.986516	6319.588772
10	1.5	8.289328	7979.063230

For GAIL.BO

	A	Call Prices	Put Prices
0	0.5	49.441519	0.000222
1	0.6	40.039122	0.009566
2	0.7	30.740133	0.122318
3	0.8	21.921927	0.715853
4	0.9	14.281221	2.486887
5	1.0	8.441235	6.058642
6	1.1	4.540337	11.569484
7	1.2	2.242694	18.683581
8	1.3	1.029235	26.881863
9	1.4	0.444106	35.708475
10	1.5	0.182160	44.858270

For YESBANK.BO

	A	Call Prices	Put Prices
0	0.5	11.191656	0.714200
1	0.6	9.765857	1.282909
2	0.7	8.515176	2.026737
3	0.8	7.426441	2.932510
4	0.9	6.482895	3.983473
5	1.0	5.667064	5.162152
6	1.1	4.962265	6.451861
7	1.2	4.353298	7.837403
8	1.3	3.826699	9.305314
9	1.4	3.370741	10.843864
10	1.5	2.975312	12.442944

For VOLTAS.BO

	A	Call Prices	Put Prices
0	0.5	411.489995	0.000061
1	0.6	333.167765	0.009848
2	0.7	255.118201	0.292302
3	0.8	179.398044	2.904163
4	0.9	112.112652	13.950790
5	1.0	60.930872	41.101027
6	1.1	28.684272	87.186445
7	1.2	11.811077	148.645268
8	1.3	4.324295	219.490504
9	1.4	1.433515	294.931742
10	1.5	0.437757	372.268002

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For MARICO.BO
       A  Call Prices  Put Prices
0   0.5   265.112955    0.000006
1   0.6   214.647497    0.001961
2   0.7   164.273023    0.094899
3   0.8   114.988425    1.277713
4   0.9    70.608588    7.365289
5   1.0    36.832961   24.057075
6   1.1    16.162156   53.853682
7   1.2     6.020596   94.179535
8   1.3     1.940756  140.567107
9   1.4     0.553417  189.647181
10  1.5     0.142583  239.703760
For UNIONBANK.BO
       A  Call Prices  Put Prices
0   0.5    44.364479    3.530580
1   0.6    39.084670    6.023991
2   0.7    34.457056    9.169597
3   0.8    30.418515   12.904276
4   0.9    26.900702   17.159683
5   1.0    23.837500   21.869700
6   1.1    21.168382   26.973802
7   1.2    18.839601   32.418240
8   1.3    16.804257   38.156116
9   1.4    15.021851   44.146930
10  1.5    13.457617   50.355916
For NAUKRI.BO
       A  Call Prices   Put Prices
0   0.5  2030.950691     0.014936
1   0.6  1644.855716     0.532811
2   0.7  1263.759001     6.048945
3   0.8   903.922680    32.825473
4   0.9   593.274486   108.790128
5   1.0   355.475959   257.604451
6   1.1   195.141828   483.883169
7   1.2    99.021631   774.375821
8   1.3    46.958307  1108.925346
9   1.4    21.042543  1469.622430
10  1.5     9.001141  1844.193877
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For ^NSEI
      A   Call Prices    Put Prices
0   0.5  9354.959193  3.637979e-12
1   0.6  7574.131110  1.078590e-06
2   0.7  5793.310006  6.980451e-03
3   0.8  4014.330590  1.855648e+00
4   0.9  2291.007873  5.936101e+01
5   1.0   921.735315  4.709165e+02
6   1.1   231.020610  1.561030e+03
7   1.2    35.212977  3.146050e+03
8   1.3     3.413380  4.895079e+03
9   1.4     0.225246  6.672719e+03
10  1.5     0.010831  8.453332e+03
For UPL.NS
      A   Call Prices  Put Prices
0   0.5   372.065469    0.000492
1   0.6   301.271850    0.033880
2   0.7   230.995066    0.584103
3   0.8   163.712915    4.128959
4   0.9   104.877402   16.120452
5   1.0    60.032243   42.102301
6   1.1    30.734628   83.631693
7   1.2    14.208800  137.932872
8   1.3     6.011489  200.562568
9   1.4     2.360499  267.738585
10  1.5     0.871605  337.076698
For ICICIBANK.NS
      A   Call Prices    Put Prices
0   0.5   465.465473  2.598740e-07
1   0.6   376.858965  3.984012e-04
2   0.7   288.300022  4.836095e-02
3   0.8   200.792657  1.147901e+00
4   0.9   120.285285  9.247434e+00
5   1.0    58.726581  3.629564e+01
6   1.1    22.806346  8.898231e+01
7   1.2     7.092030  1.618749e+02
8   1.3     1.809024  2.451988e+02
9   1.4     0.389916  3.323866e+02
10  1.5     0.073104  4.206767e+02
For WIPRO.NS
      A   Call Prices    Put Prices
0   0.5   201.351602  9.881404e-08
1   0.6   163.022082  1.596810e-04
2   0.7   124.712276  2.003282e-02
3   0.8    86.847785  4.852211e-01
4   0.9    51.988339  3.955455e+00
5   1.0    25.327454  1.562425e+01
6   1.1     9.794905  3.842138e+01
7   1.2     3.026719  6.998287e+01
8   1.3     0.765681  1.060515e+02
9   1.4     0.163398  1.437789e+02
10  1.5     0.030289  1.819755e+02
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For TECHM.NS
      A   Call Prices  Put Prices
0   0.5   524.002121    0.001227
1   0.6   424.318837    0.067764
2   0.7   325.517058    1.015806
3   0.8   231.325754    6.574324
4   0.9   149.311189   24.309580
5   1.0    86.728562   61.476775
6   1.1    45.425459  119.923492
7   1.2    21.655841  195.903696
8   1.3     9.515914  283.513590
9   1.4     3.904677  377.652175
10  1.5     1.514385  475.011704
For ASIANPAINT.NS
      A   Call Prices    Put Prices
0   0.5  1604.024246  2.708020e-10
1   0.6  1298.679108  1.189375e-05
2   0.7   993.345646  1.170116e-02
3   0.8   688.984043  9.952491e-01
4   0.9   399.374531  1.673089e+01
5   1.0   173.707923  9.640943e+01
6   1.1    52.843736  2.808904e+02
7   1.2    11.177686  5.445695e+02
8   1.3     1.702545  8.404395e+02
9   1.4     0.196103  1.144278e+03
10  1.5     0.017933  1.449445e+03
For EICHERMOT.NS
      A   Call Prices   Put Prices
0   0.5  1685.623491     0.008296
1   0.6  1365.082971     0.344737
2   0.7  1048.174481     4.313208
3   0.8   747.881161    24.896849
4   0.9   487.860434    85.753084
5   1.0   289.068523   207.838134
6   1.1   156.058561   395.705133
7   1.2    77.463403   637.986936
8   1.3    35.763156   917.163650
9   1.4    15.538290  1217.815745
10  1.5     6.422453  1529.576869
For NTPC.NS
      A   Call Prices    Put Prices
0   0.5    85.433536  1.198697e-07
1   0.6    69.170370  1.262360e-04
2   0.7    52.919064  1.211325e-02
3   0.8    36.892499  2.488413e-01
4   0.9    22.222194  1.841829e+00
5   1.0    11.022051  6.904979e+00
6   1.1     4.411374  1.655759e+01
7   1.2     1.435419  2.984493e+01
8   1.3     0.388506  4.506131e+01
9   1.4     0.089919  6.102602e+01
10  1.5     0.018282  7.721767e+01
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For LT.NS

	A	Call Prices	Put Prices
0	0.5	1083.609773	0.000005
1	0.6	877.335034	0.003313
2	0.7	671.286646	0.232971
3	0.8	468.727604	3.951975
4	0.9	284.627382	26.129799
5	1.0	144.314963	92.095427
6	1.1	60.172779	214.231289
7	1.2	20.806275	381.142831
8	1.3	6.093821	572.708424
9	1.4	1.550149	774.442798
10	1.5	0.350901	979.521597

For COALINDIA.NS

	A	Call Prices	Put Prices
0	0.5	113.868695	0.000009
1	0.6	92.194341	0.001918
2	0.7	70.581982	0.065821
3	0.8	49.555824	0.715926
4	0.9	30.795575	3.631940
5	1.0	16.525835	11.038463
6	1.1	7.615416	23.804306
7	1.2	3.042679	40.907832
8	1.3	1.072365	60.613782
9	1.4	0.339880	81.557559
10	1.5	0.098670	102.992612

For GRASIM.NS

	A	Call Prices	Put Prices
0	0.5	899.344861	1.716152e-07
1	0.6	728.144246	4.082308e-04
2	0.7	557.008039	6.522506e-02
3	0.8	387.574176	1.832385e+00
4	0.9	230.828349	1.628758e+01
5	1.0	110.732430	6.739268e+01
6	1.1	41.548154	1.694094e+02
7	1.2	12.260941	3.113232e+02
8	1.3	2.919363	4.731827e+02
9	1.4	0.579132	6.420435e+02
10	1.5	0.098776	8.127641e+02

For BHEL.NS

	A	Call Prices	Put Prices
0	0.5	40.865651	0.134220
1	0.6	33.531419	0.553702
2	0.7	26.774937	1.550933
3	0.8	20.837722	3.367433
4	0.9	15.852005	6.135429
5	1.0	11.828723	9.865861
6	1.1	8.687969	14.478821
7	1.2	6.300960	19.845525
8	1.3	4.524903	25.823183
9	1.4	3.225151	32.277144
10	1.5	2.286042	39.091749

For DABUR.NS

	A	Call Prices	Put Prices
0	0.5	288.706433	2.145106e-07
1	0.6	233.748011	2.926566e-04
2	0.7	178.822030	3.302437e-02
3	0.8	124.579799	7.495077e-01
4	0.9	74.753173	5.881595e+00
5	1.0	36.673023	2.276016e+01
6	1.1	14.374762	5.542061e+01
7	1.2	4.533199	1.005378e+02
8	1.3	1.177757	1.521410e+02
9	1.4	0.259522	2.061815e+02
10	1.5	0.049897	2.609306e+02

For COLPAL.NS

	A	Call Prices	Put Prices
0	0.5	793.340719	0.000060
1	0.6	642.331533	0.012733
2	0.7	491.742798	0.445857
3	0.8	345.185224	4.910141
4	0.9	214.349455	25.096231
5	1.0	114.830102	76.598736
6	1.1	52.762473	165.552966
7	1.2	20.994265	284.806616
8	1.3	7.360752	422.194962
9	1.4	2.318623	568.174691
10	1.5	0.668456	717.546384

For MRF.NS

	A	Call Prices	Put Price
0	0.5	45035.129372	0.00000
1	0.6	36462.170631	0.01539
2	0.7	27891.963561	2.78244
3	0.8	19400.516185	84.30919
4	0.9	11526.346861	783.11400
5	1.0	5487.408607	3317.14987
6	1.1	2027.893106	8430.60850
7	1.2	584.635105	15560.32462
8	1.3	134.979095	23683.64274
9	1.4	25.798588	32147.43636
10	1.5	4.217122	40698.82902

For GAIL.NS

	A	Call Prices	Put Prices
0	0.5	49.595193	0.000191
1	0.6	40.162731	0.008729
2	0.7	30.828847	0.115845
3	0.8	21.966149	0.694148
4	0.9	14.278081	2.447080
5	1.0	8.404385	6.014384
6	1.1	4.492182	11.543182
7	1.2	2.200451	18.692451
8	1.3	0.999597	26.932598
9	1.4	0.426263	35.800263
10	1.5	0.172564	44.987565

For HAVELLS.NS

	A	Call Prices	Put Prices
0	0.5	568.651784	0.000007
1	0.6	460.405178	0.003051
2	0.7	352.321514	0.169036
3	0.8	246.377542	2.474714
4	0.9	150.647647	14.994468
5	1.0	77.760224	50.356695
6	1.1	33.487719	114.333839
7	1.2	12.140413	201.236183
8	1.3	3.779510	301.124929
9	1.4	1.034015	406.629084
10	1.5	0.254201	514.098920

For POONAWALLA.NS

	A	Call Prices	Put Prices
0	0.5	159.843640	1.913280
1	0.6	133.207576	5.341145
2	0.7	109.291220	11.488717
3	0.8	88.511780	20.773204
4	0.9	70.944861	33.270214
5	1.0	56.413368	48.802648
6	1.1	44.593637	67.046846
7	1.2	35.101950	87.619087
8	1.3	27.552334	110.133399
9	1.4	21.589332	134.234324
10	1.5	16.902928	159.611849

For BOSCHLTD.NS

	A	Call Prices	Put Prices
0	0.5	8798.219258	0.000007
1	0.6	7123.382763	0.009506
2	0.7	5449.570879	1.043616
3	0.8	3796.970031	23.288761
4	0.9	2279.788655	180.953380
5	1.0	1120.490735	696.501453
6	1.1	440.746081	1691.602793
7	1.2	139.730649	3065.433355
8	1.3	36.555333	4637.104032
9	1.4	8.122401	6283.517093
10	1.5	1.576527	7951.817214

For UNIONBANK.NS

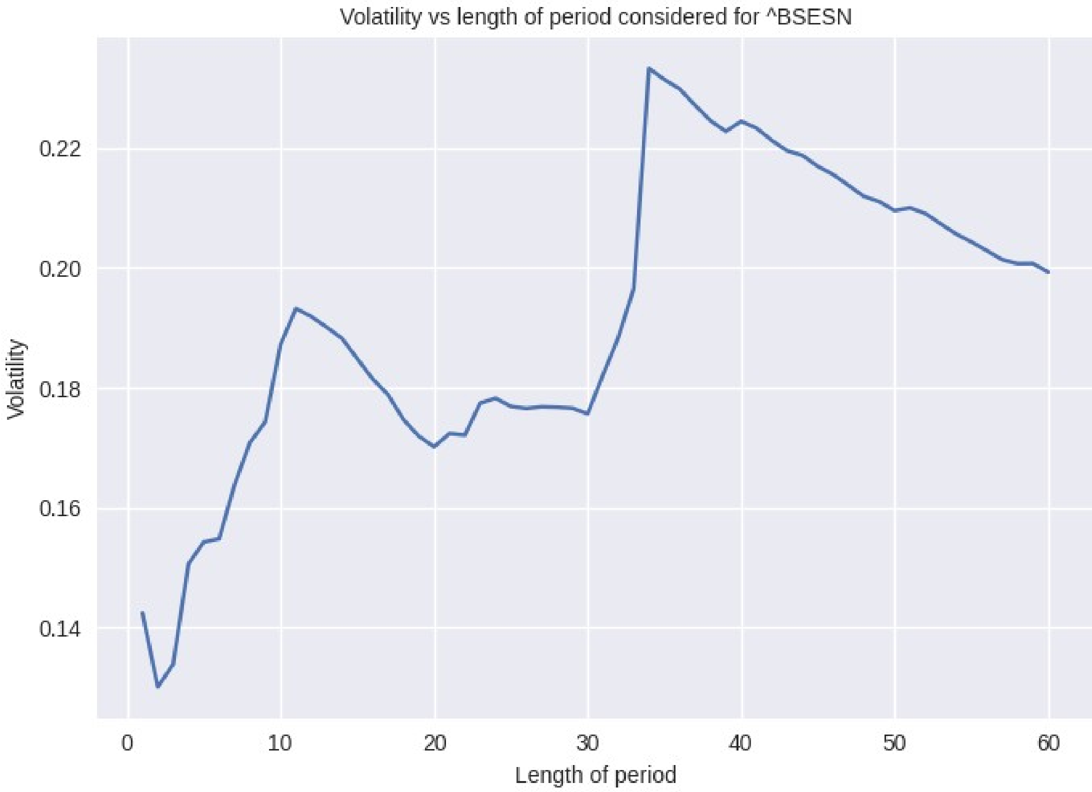
	A	Call Prices	Put Prices
0	0.5	43.943992	2.853921
1	0.6	38.373325	5.105239
2	0.7	33.487305	8.041204
3	0.8	29.233205	11.609090
4	0.9	25.544992	15.742862
5	1.0	22.354253	20.374108
6	1.1	19.595893	25.437733
7	1.2	17.210747	30.874572
8	1.3	15.146461	36.632271
9	1.4	13.357461	42.665257
10	1.5	11.804476	48.934257

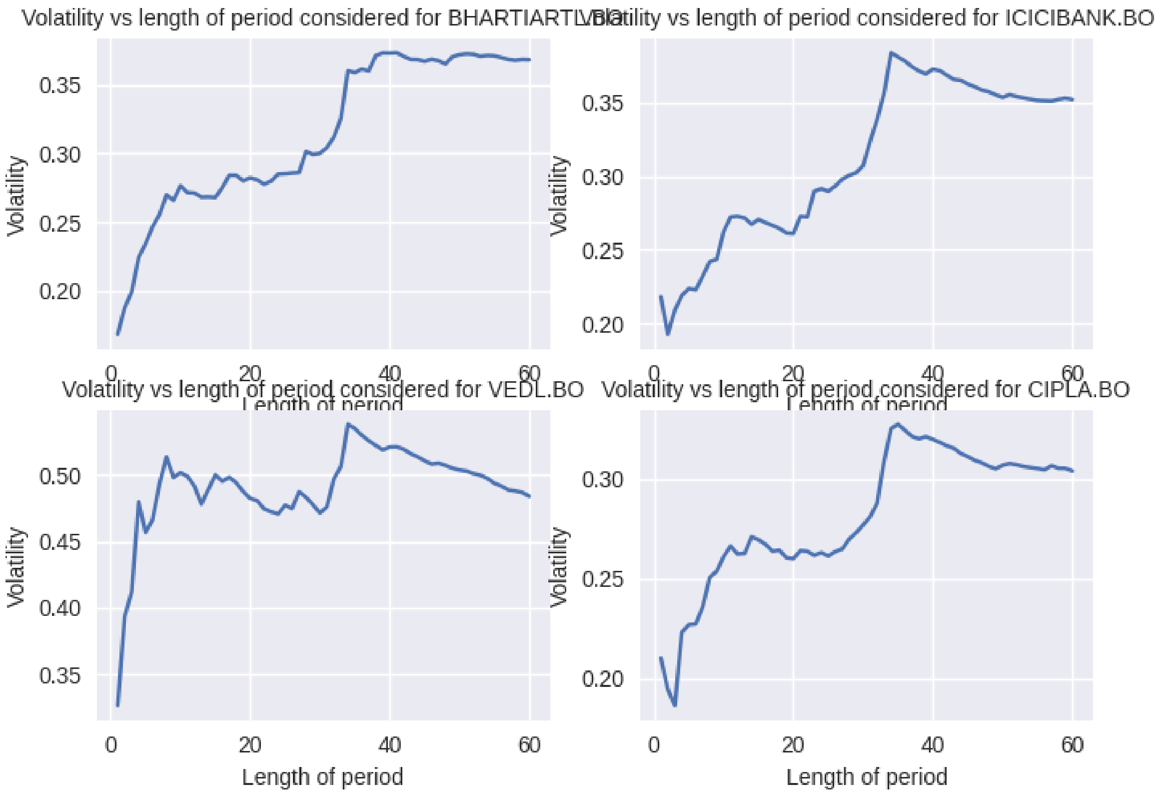
For GODREJCP.NS

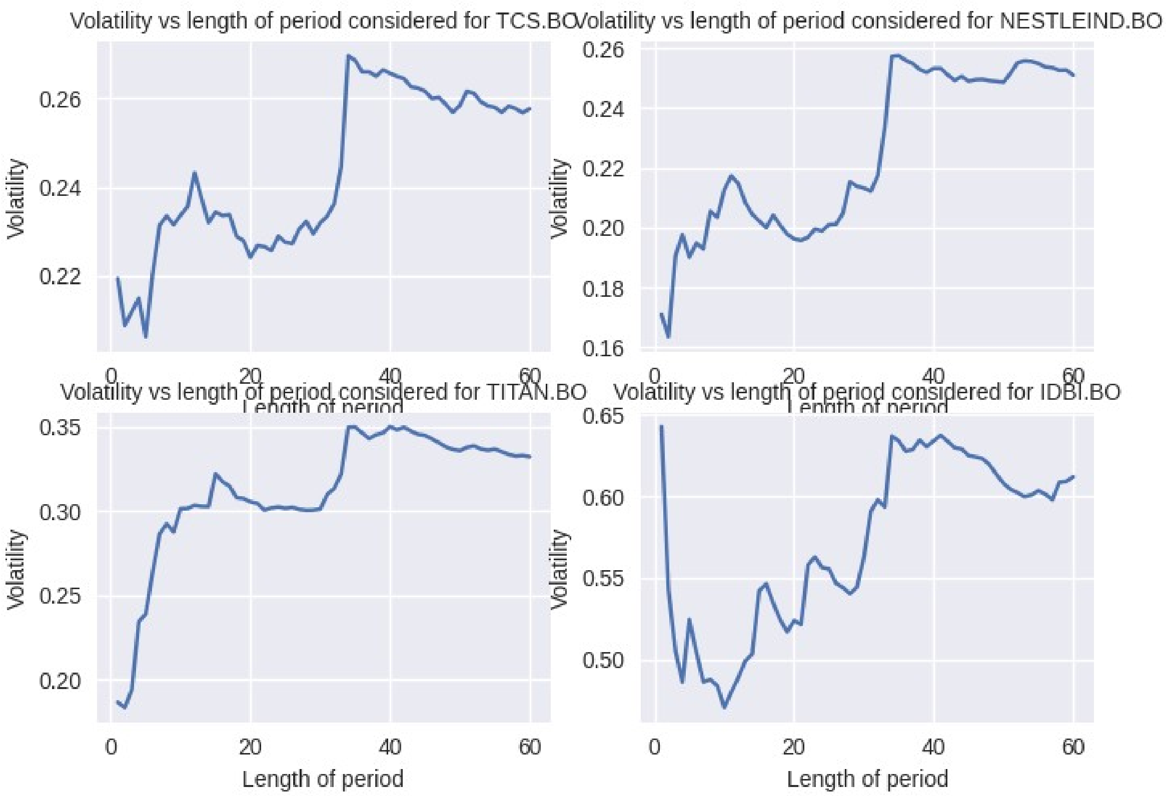
	A	Call Prices	Put Prices
0	0.5	455.987097	0.000008
1	0.6	369.187553	0.003046
2	0.7	282.535802	0.153878
3	0.8	197.706819	2.127476
4	0.9	121.235757	12.458997
5	1.0	63.029593	41.055415
6	1.1	27.492822	92.321226
7	1.2	10.153537	161.784523
8	1.3	3.237084	241.670652
9	1.4	0.911042	326.147192
10	1.5	0.231264	412.269996

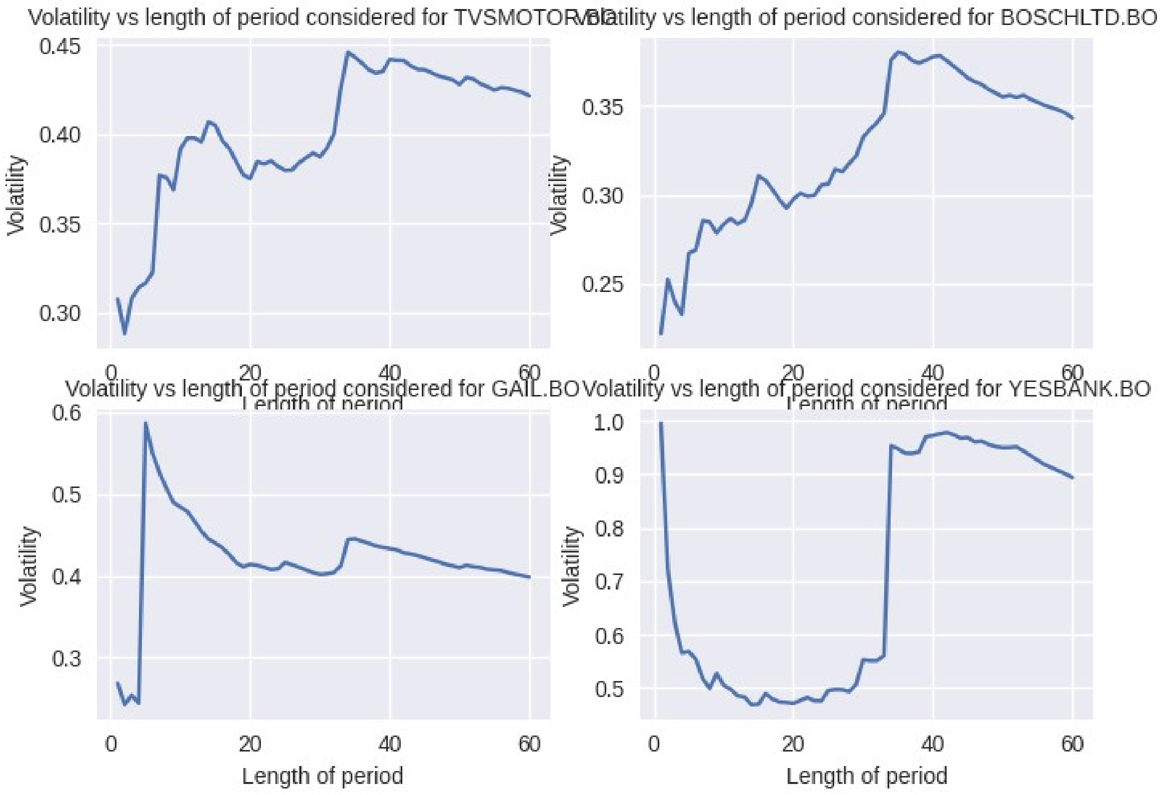
Part - (c)

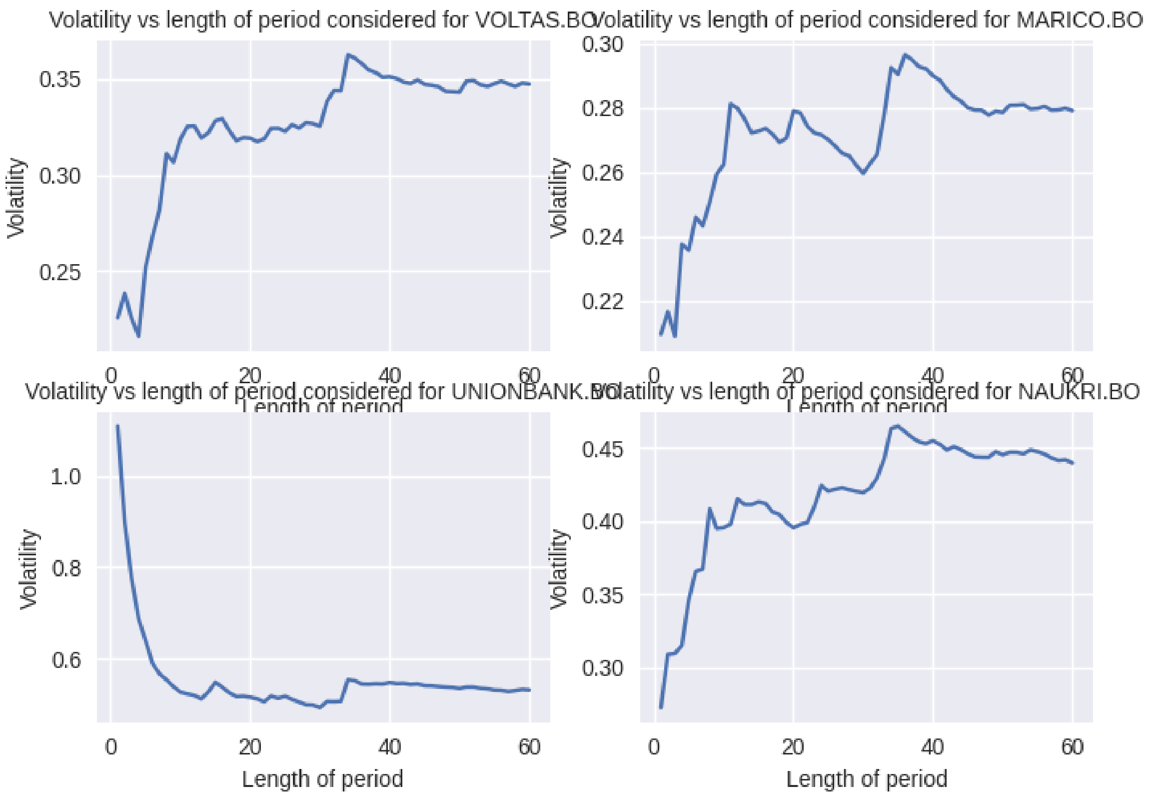
Plot for volatility vs length of period for different stocks

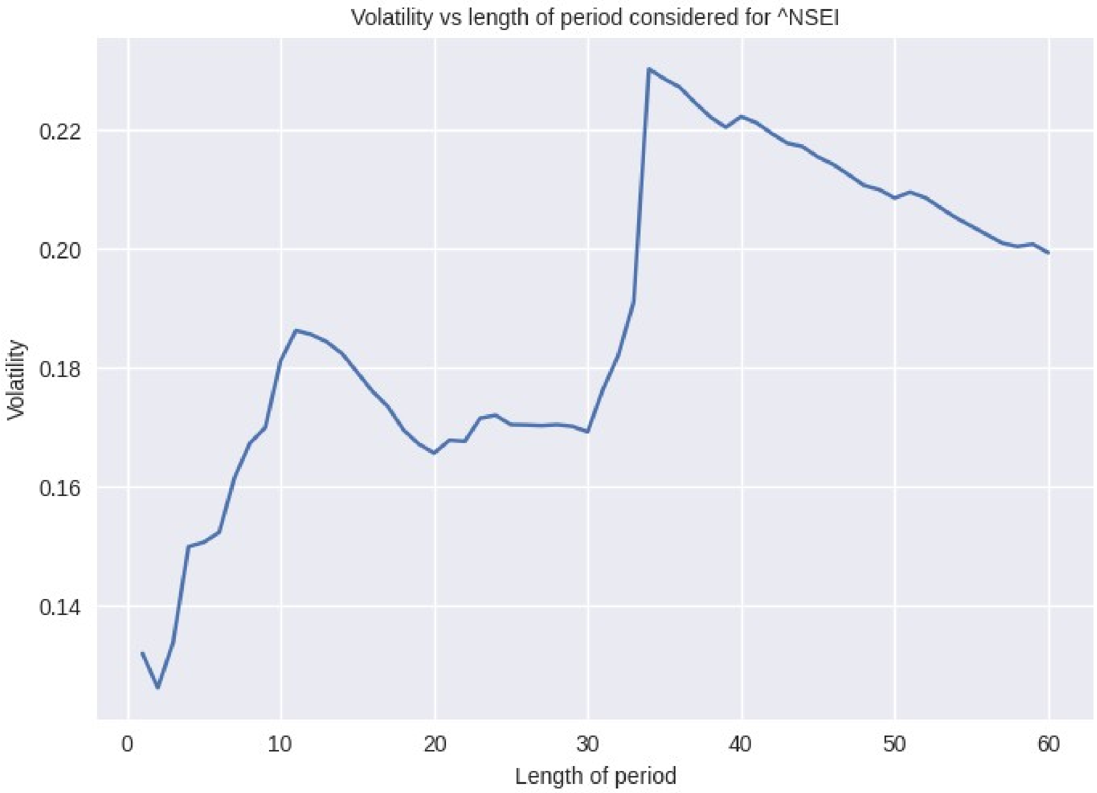


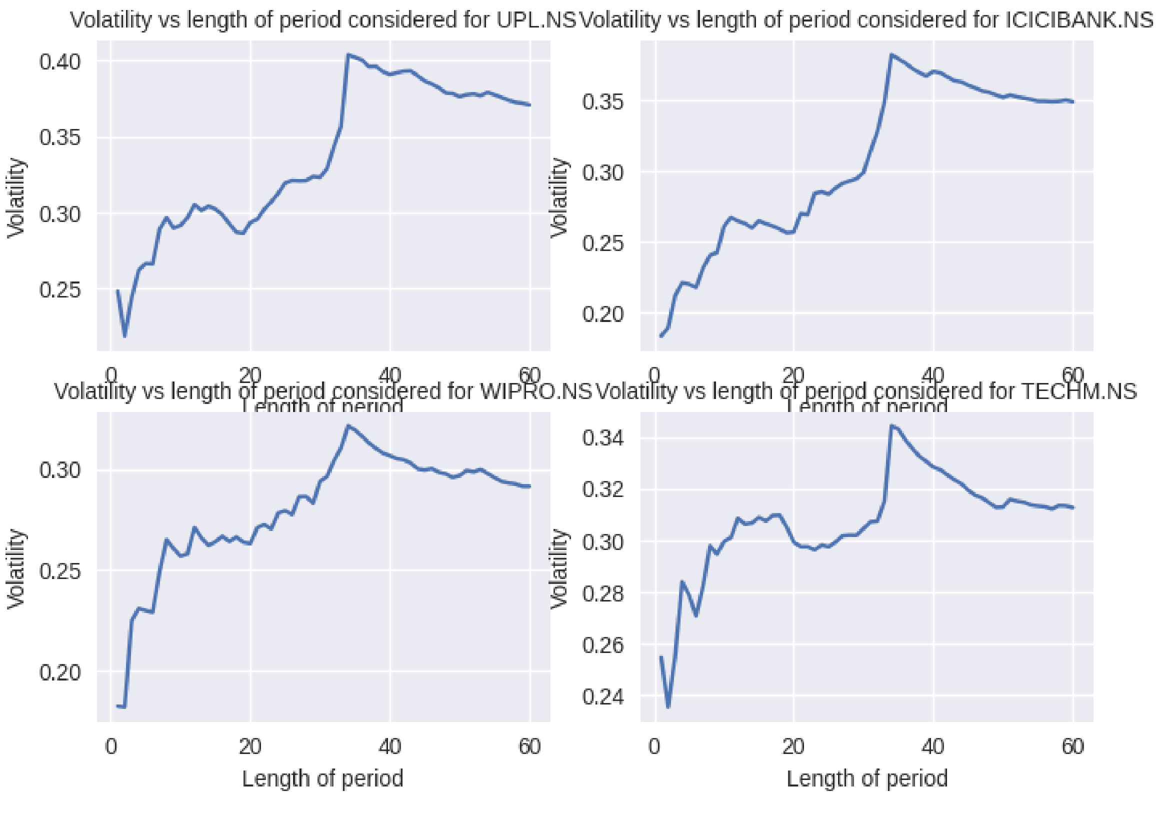

Volatility vs length of period considered for BHARTIARTL.BO
Volatility vs length of period considered for ICICIBANK.BO
Volatility vs length of period considered for VEDL.BO
Volatility vs length of period considered for CIPLA.BO
Volatility
Length of period

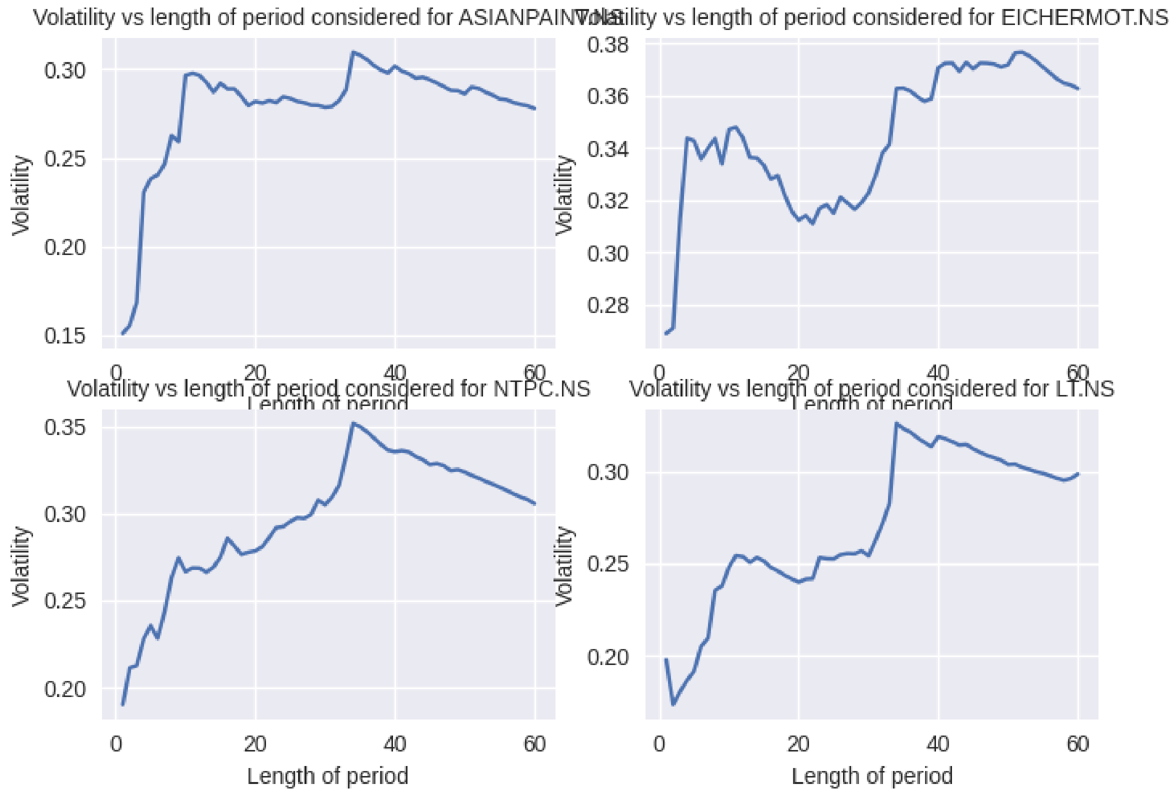

Volatility vs length of period considered for TCS.BO
Volatility vs length of period considered for NESTLEIND.BO
Volatility vs length of period considered for TITAN.BO
Volatility vs length of period considered for IDBI.BO
Volatility
Length of period

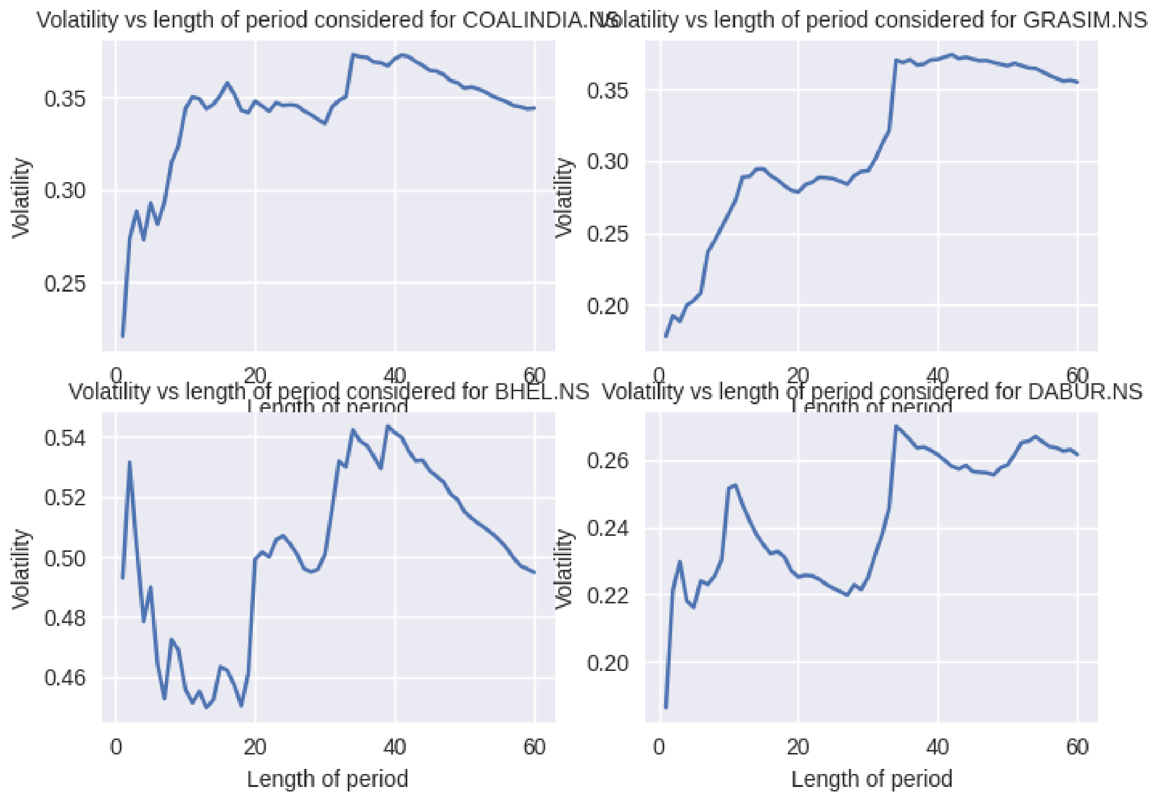

Volatility vs length of period considered for TVSMOTOR.BO
Volatility vs length of period considered for BOSCHLTD.BO
Volatility vs length of period considered for GAIL.BO
Volatility vs length of period considered for YESBANK.BO
Volatility
Length of period
0.45
0.40
0.35
0.30
0.25
0.6
0.5
0.4
0.3
1.0
0.9
0.8
0.7
0.6
0.5
0
20
40
60

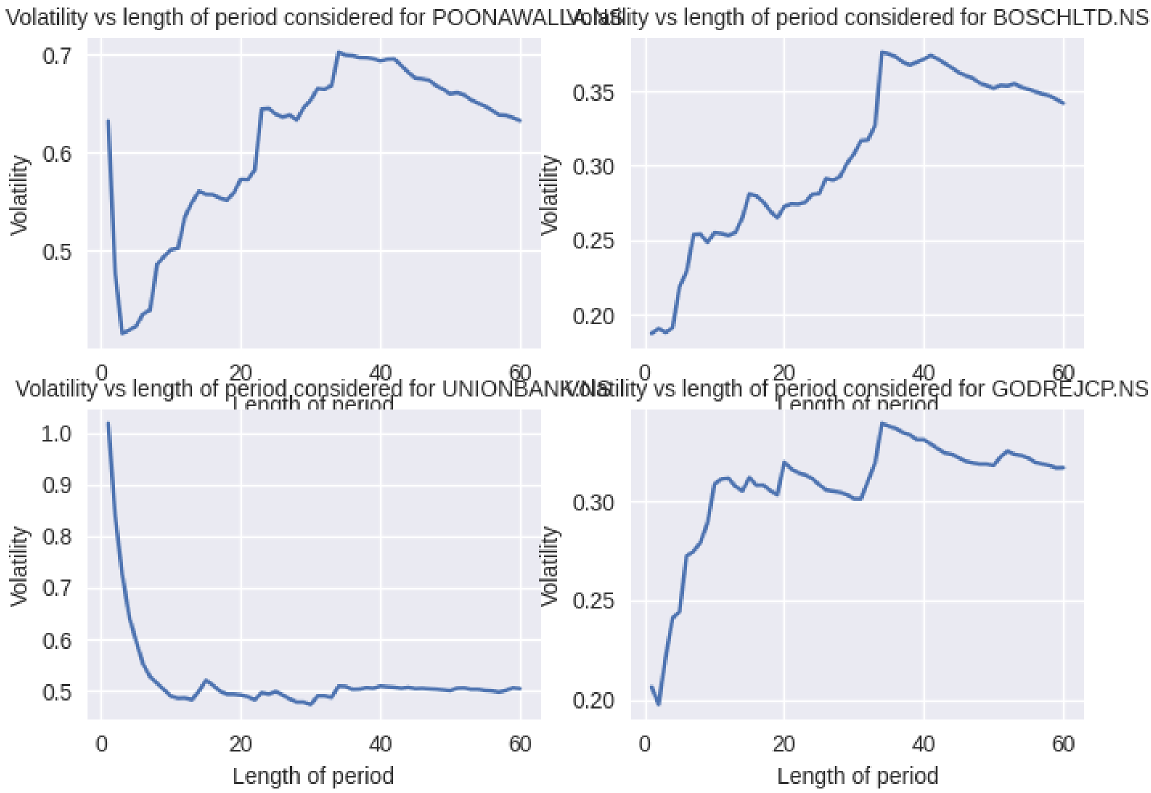

Volatility vs length of period considered for VOLTAS.BO
Volatility vs length of period considered for MARICO.BO
Volatility vs length of period considered for UNIONBANK.BO
Volatility vs length of period considered for NAUKRI.BO
Volatility
Length of period
0.35
0.30
0.25
0.28
0.26
0.24
0.22
1.0
0.8
0.6
0.45
0.40
0
20
40
60


Volatility vs length of period considered for ^NSEI
Volatility
Length of period
0.14
0.16
0.18
0.20
0.22
0
10
20
30
40
50
60


Volatility vs length of period considered for UPL.NS
Volatility vs length of period considered for ICICIBANK.NS
Volatility vs length of period considered for WIPRO.NS
Volatility vs length of period considered for TECHM.NS
Volatility
Length of period


Volatility vs length of period considered for ASIANPAINT.NS
Volatility vs length of period considered for EICHERMOT.NS
Volatility vs length of period considered for NTPC.NS
Volatility vs length of period considered for LT.NS
Volatility
Length of period

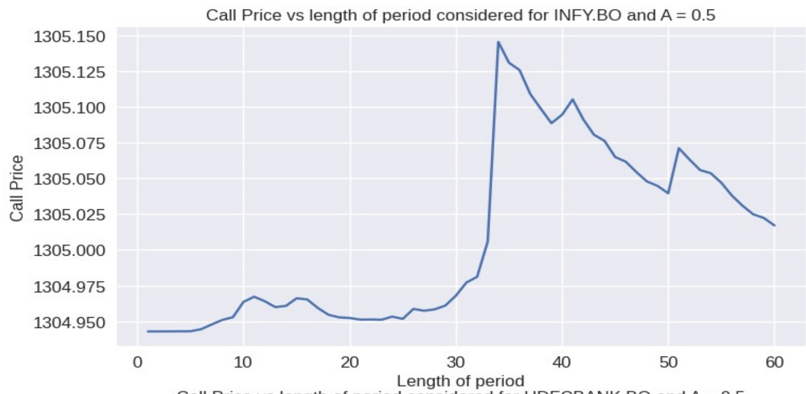

Volatility vs length of period considered for COALINDIA.NS
Volatility vs length of period considered for GRASIM.NS
Volatility vs length of period considered for BHEL.NS
Volatility vs length of period considered for DABUR.NS
Volatility
Length of period

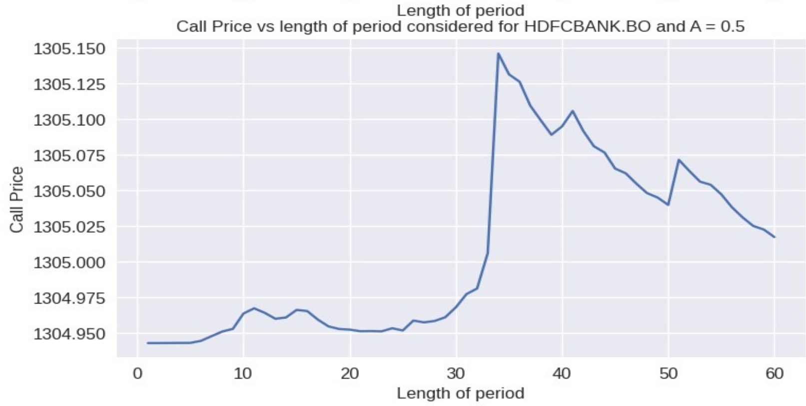


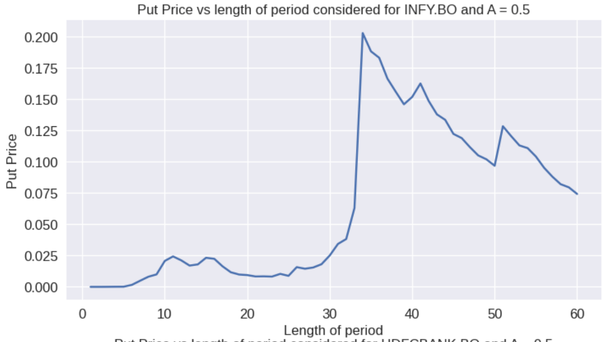
Part - (c)

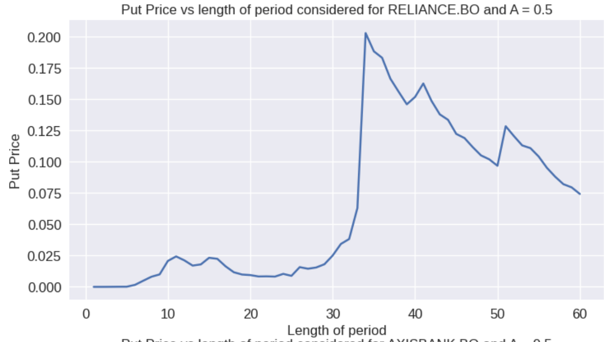
Plots for price of call and put option vs length of period considered

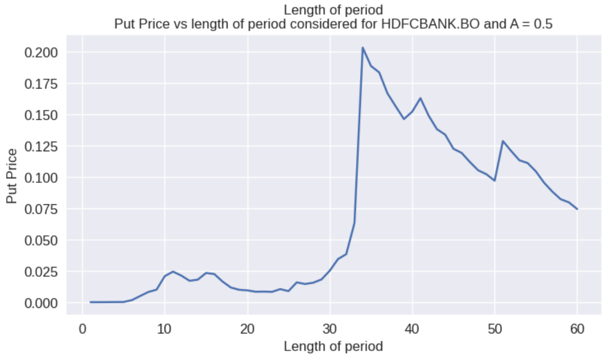
Note - I am only attaching a few plots as the total number of plots are very large.

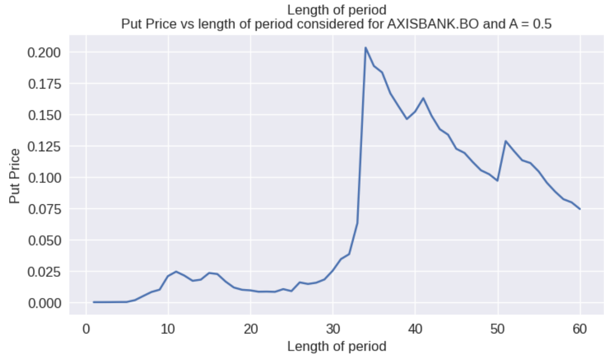


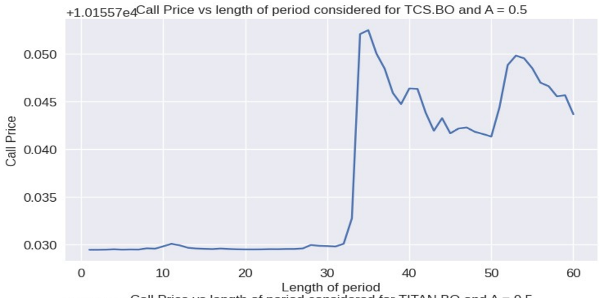


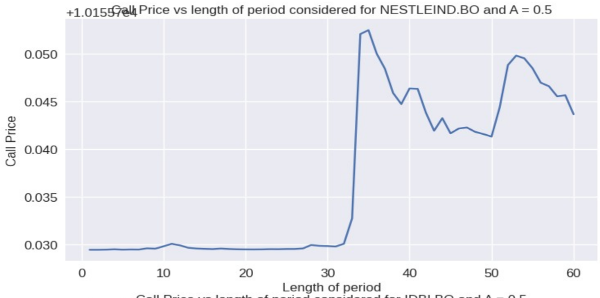

Put Price vs length of period considered for INFY.BO and A = 0.5
Put Price
Length of period

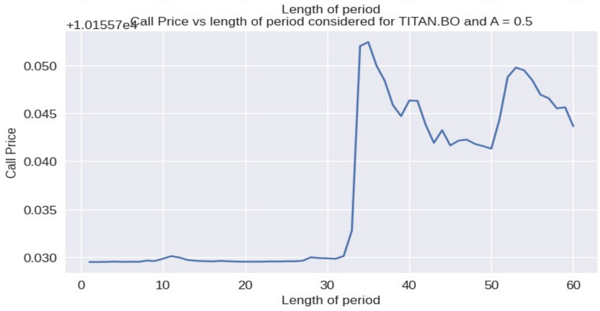

Put Price vs length of period considered for RELIANCE.BO and A = 0.5
Put Price
Length of period

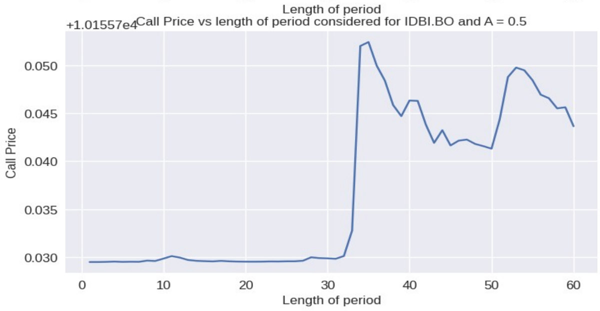

Put Price vs length of period considered for HDFCBANK.BO and A = 0.5
Put Price
Length of period

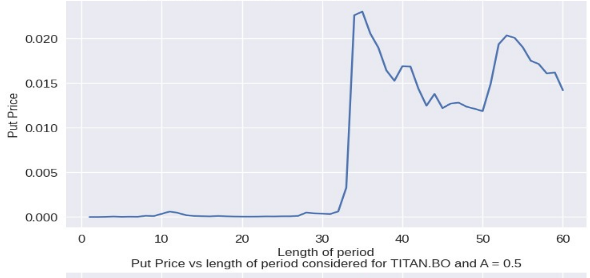

Put Price vs length of period considered for AXISBANK.BO and A = 0.5
Put Price
Length of period

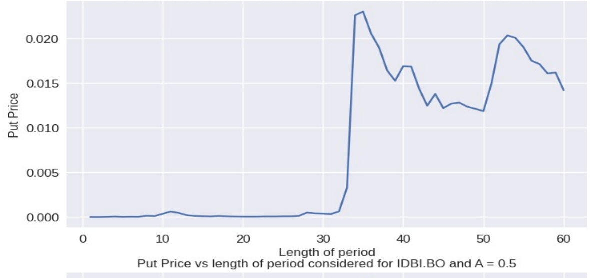

+1.01557e4
Call Price vs length of period considered for TCS.BO and A = 0.5
Call Price
Length of period

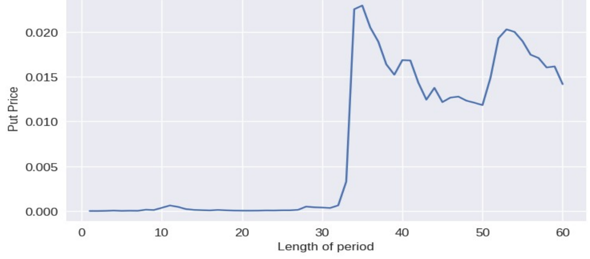

+1.01557e4
Call Price vs length of period considered for NESTLEIND.BO and A = 0.5
Call Price
Length of period

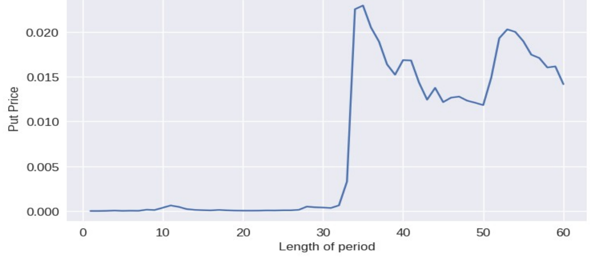

+1.01557e4
Call Price vs length of period considered for TITAN.BO and A = 0.5
Call Price
Length of period

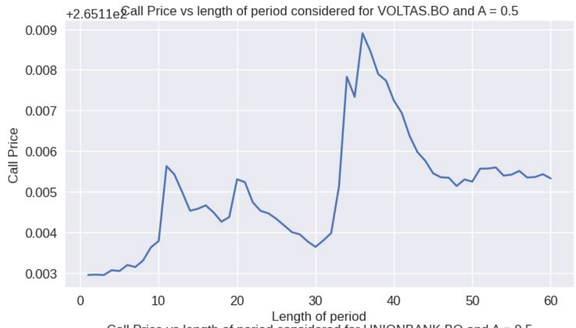

+1.01557e4
Call Price vs length of period considered for IDBI.BO and A = 0.5
Call Price
Length of period


Put Price vs length of period considered for TCS.BO and A = 0.5
Put Price
Length of period

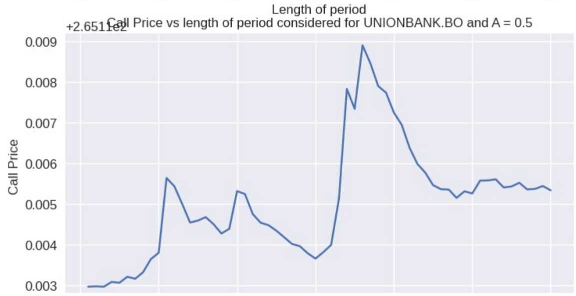

Put Price vs length of period considered for NESTLEIND.BO and A = 0.5
Put Price
Length of period

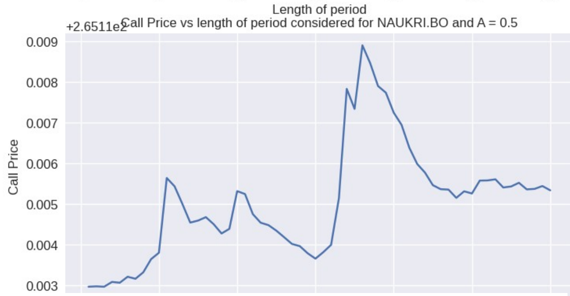

Put Price vs length of period considered for TITAN.BO and A = 0.5
Put Price
Length of period

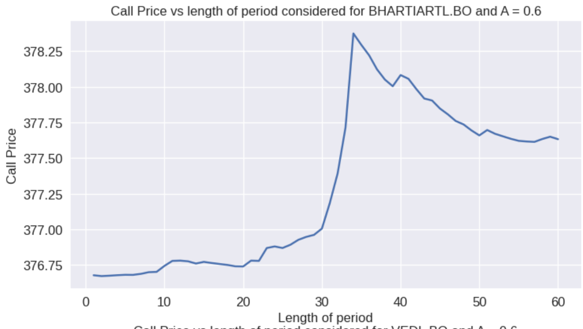

Put Price vs length of period considered for IDBI.BO and A = 0.5
Put Price
Length of period

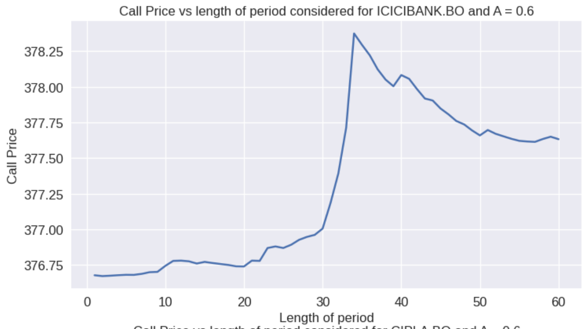

+2.6511e2
Call Price vs length of period considered for VOLTAS.BO and A = 0.5
Call Price
Length of period

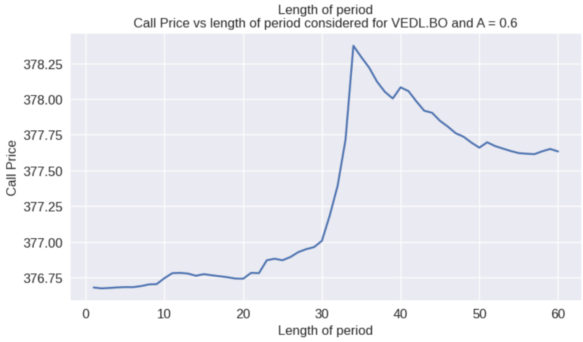

+2.6511e2
Call Price vs length of period considered for MARICO.BO and A = 0.5
Call Price
Length of period

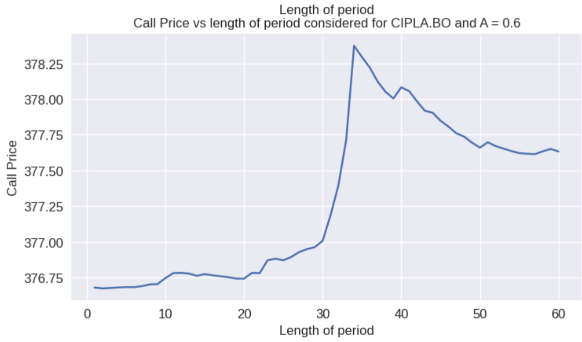

+2.6511e2
Call Price vs length of period considered for UNIONBANK.BO and A = 0.5
Call Price

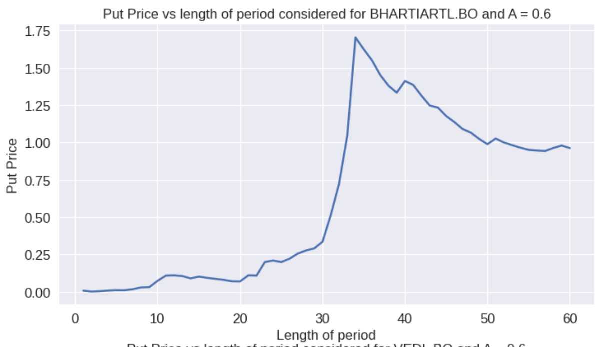

+2.6511e2
Call Price vs length of period considered for NAUKRI.BO and A = 0.5
Call Price

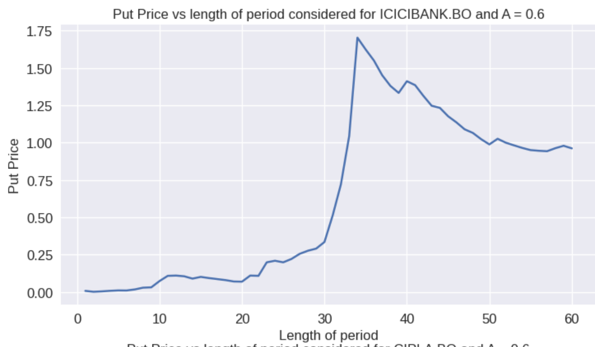

Call Price vs length of period considered for BHARTIARTL.BO and A = 0.6
Call Price
Length of period

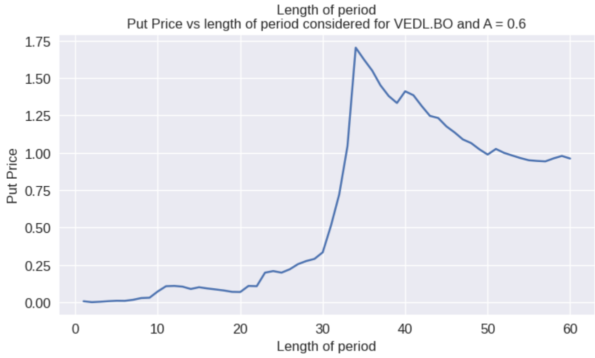

Call Price vs length of period considered for ICICIBANK.BO and A = 0.6
Call Price
Length of period

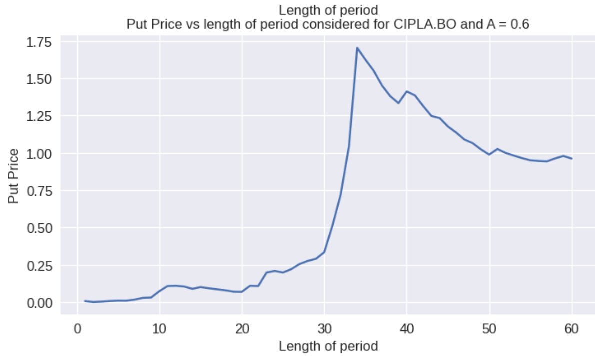

Call Price vs length of period considered for VEDL.BO and A = 0.6
Call Price
Length of period


Call Price vs length of period considered for CIPLA.BO and A = 0.6
Call Price
Length of period

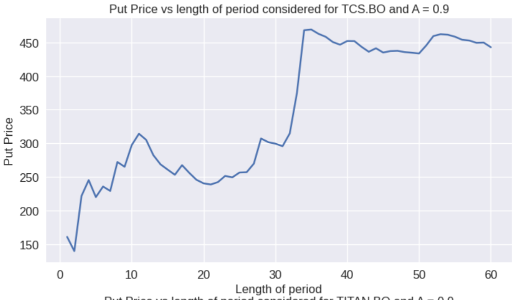

Put Price vs length of period considered for BHARTIARTL.BO and A = 0.6
Put Price
Length of period


Put Price vs length of period considered for ICICIBANK.BO and A = 0.6
Put Price
Length of period

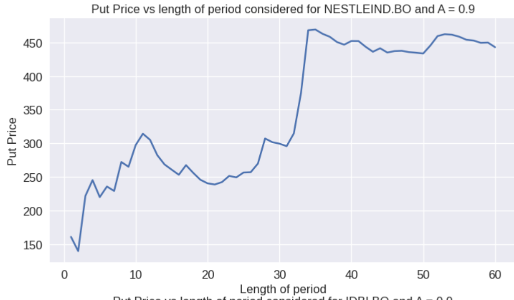

Put Price vs length of period considered for VEDL.BO and A = 0.6
Put Price
Length of period


Put Price vs length of period considered for CIPLA.BO and A = 0.6
Put Price
Length of period

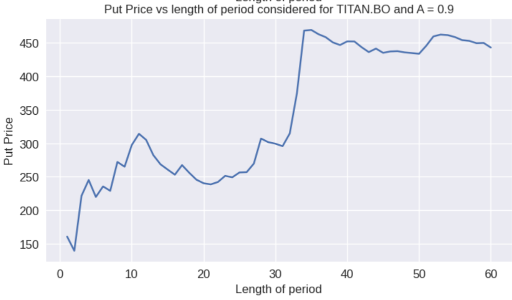
Put Price vs length of period considered for TCS.BO and A = 0.9



Put Price vs length of period considered for NESTLEIND.BO and A = 0.9

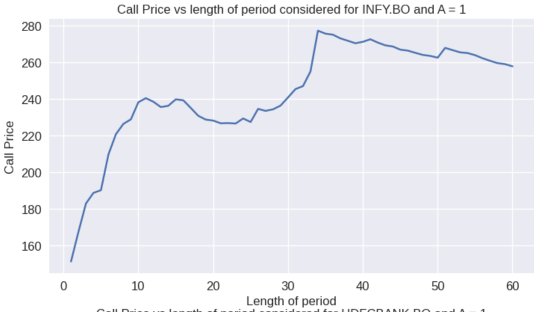


Put Price vs length of period considered for TITAN.BO and A = 0.9

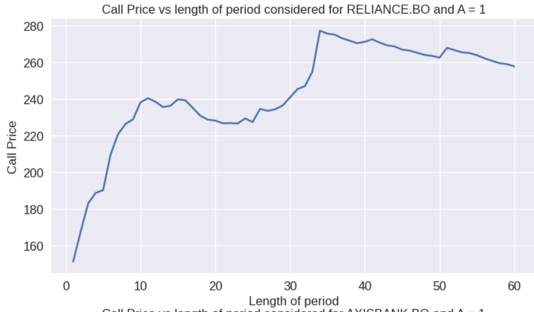


Put Price vs length of period considered for IDBI.BO and A = 0.9

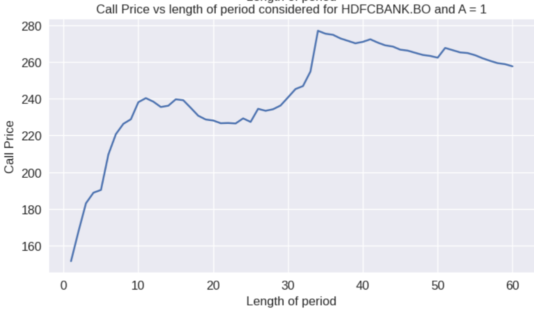
Call Price vs length of period considered for INFY.BO and A = 1



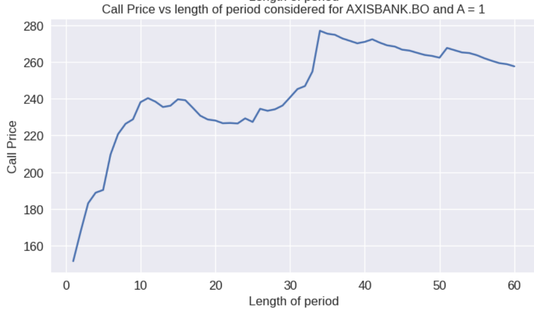
Call Price vs length of period considered for RELIANCE.BO and A = 1



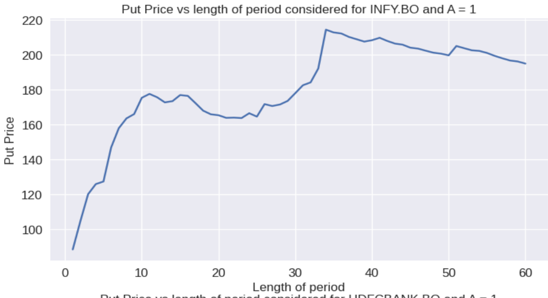
Call Price vs length of period considered for HDFCBANK.BO and A = 1



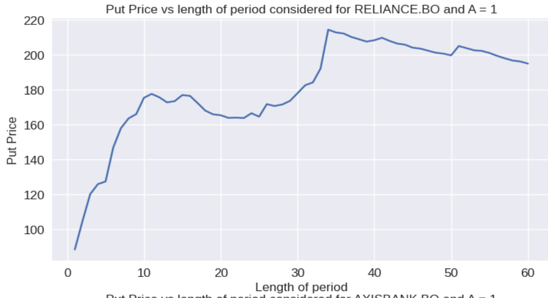
Call Price vs length of period considered for AXISBANK.BO and A = 1



Put Price vs length of period considered for INFY.BO and A = 1



Put Price vs length of period considered for RELIANCE.BO and A = 1



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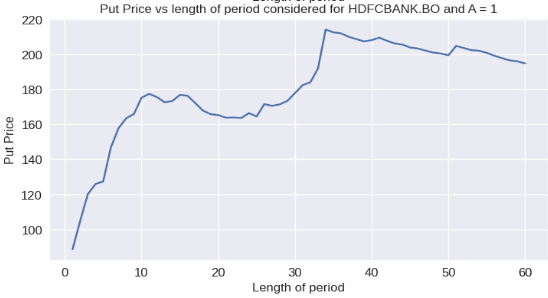
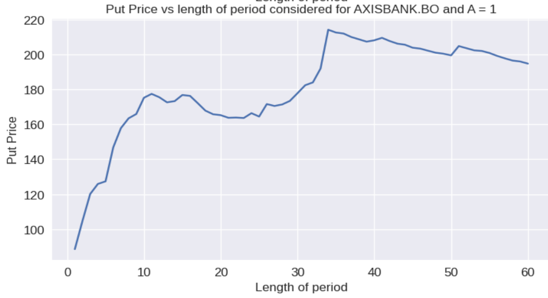
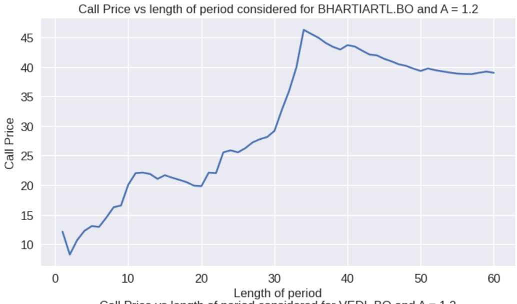
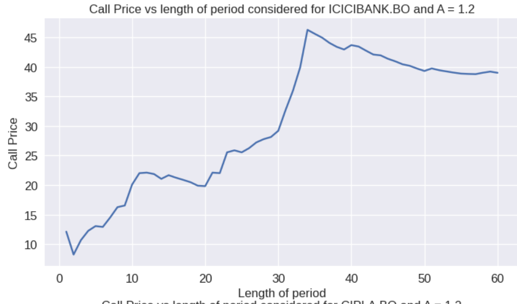
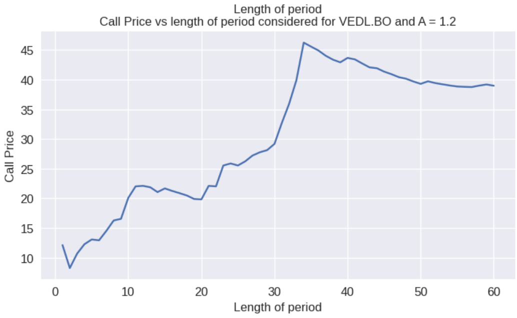


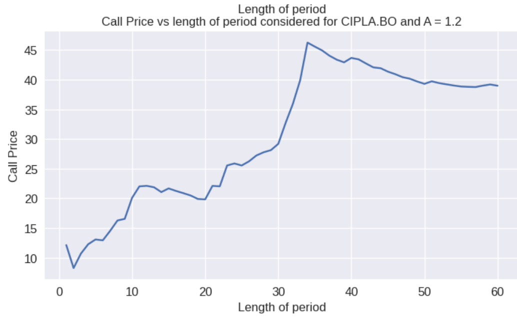
Put Price vs length of period considered for AXISBANK.BO and A = 1

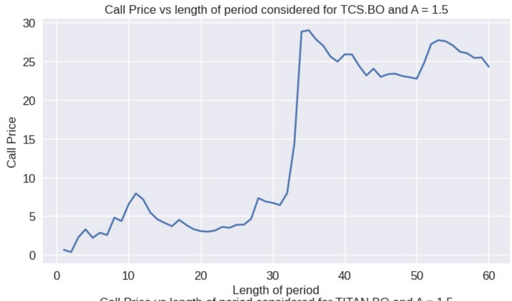


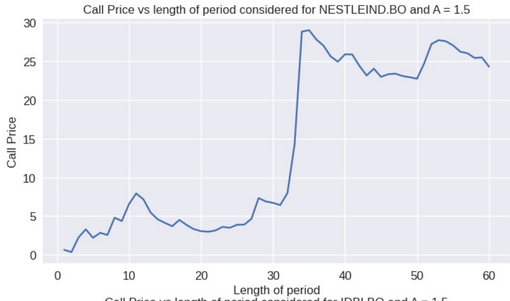

Call Price vs length of period considered for BHARTIARTL.BO and A = 1.2
Call Price
Length of period

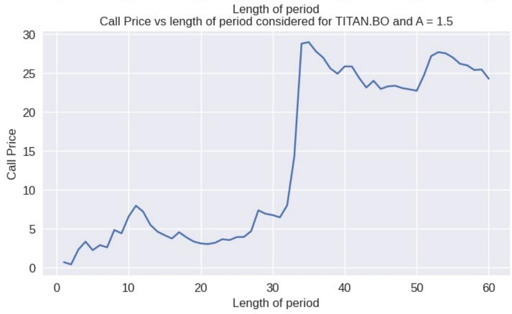

Call Price vs length of period considered for ICICIBANK.BO and A = 1.2
Call Price
Length of period

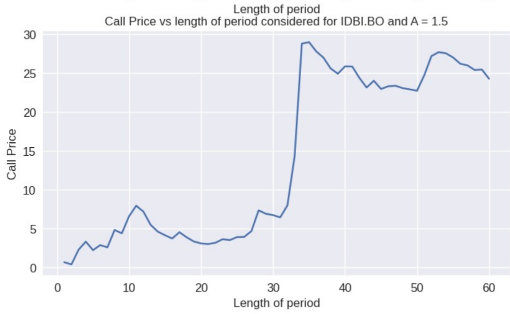

Call Price vs length of period considered for VEDL.BO and A = 1.2
Call Price
Length of period

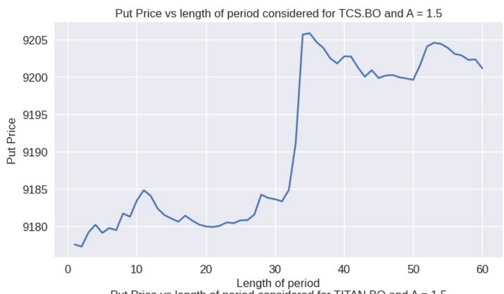

Call Price vs length of period considered for CIPLA.BO and A = 1.2
Call Price
Length of period

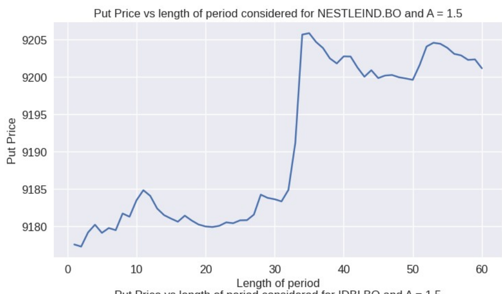

Call Price vs length of period considered for TCS.BO and A = 1.5
Call Price
Length of period


Call Price vs length of period considered for NESTLEIND.BO and A = 1.5
Call Price
Length of period


Call Price vs length of period considered for TITAN.BO and A = 1.5
Call Price
Length of period


Call Price vs length of period considered for IDBI.BO and A = 1.5
Call Price
Length of period


Put Price vs length of period considered for TCS.BO and A = 1.5
Put Price
Length of period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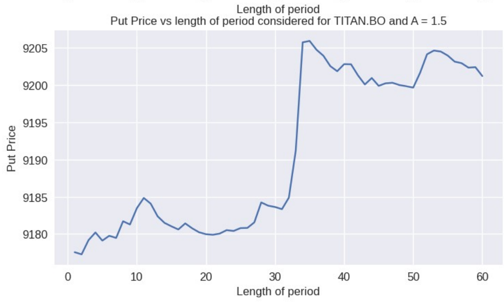
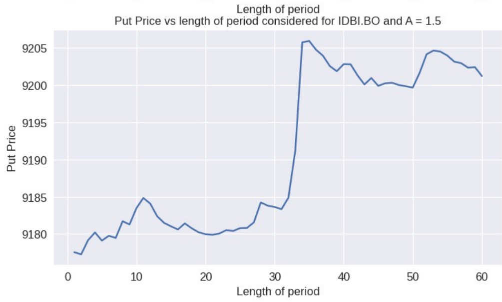
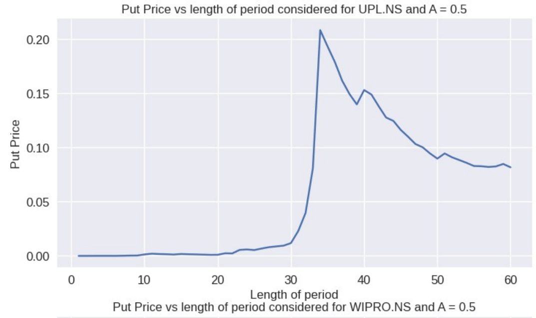
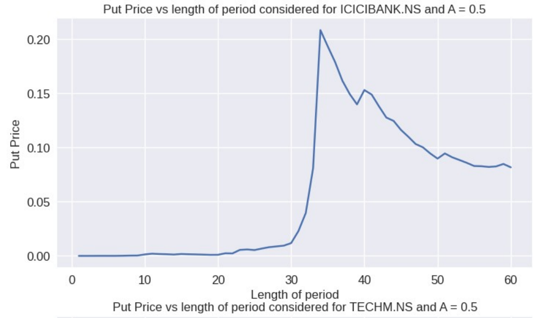
Put Price
Length of period

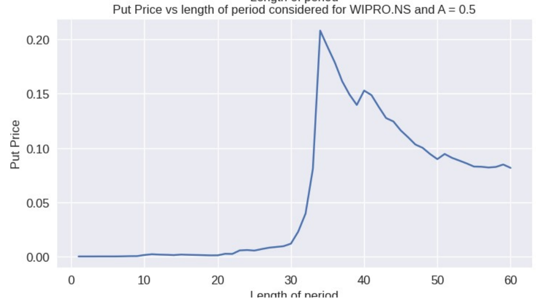

Put Price vs length of period considered for TITAN.BO and A = 1.5
Put Price
Length of period

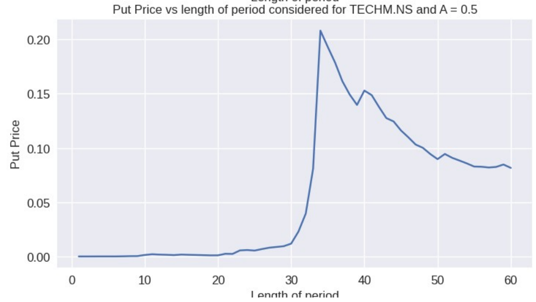

Put Price vs length of period considered for IDBI.BO and A = 1.5
Put Price
Length of period

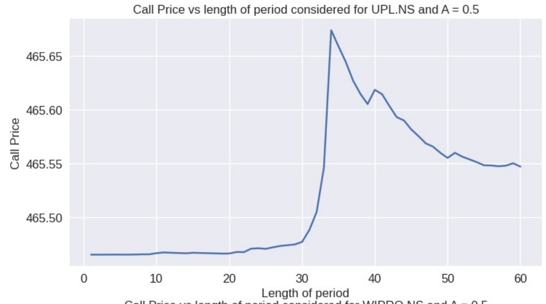
For nse stocks

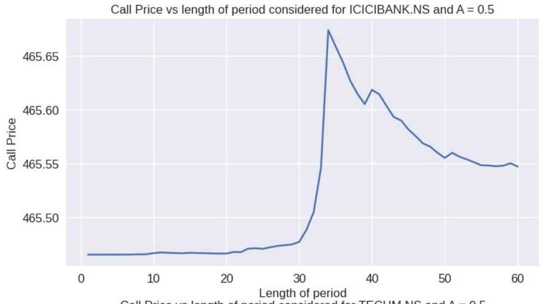


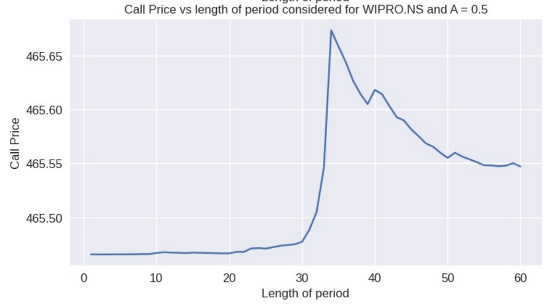


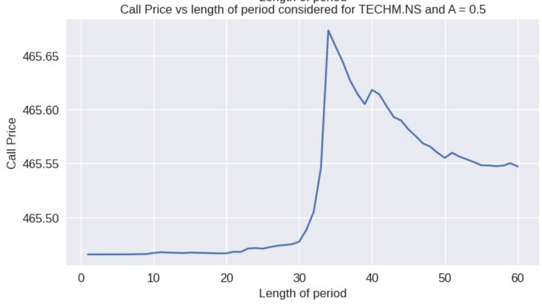


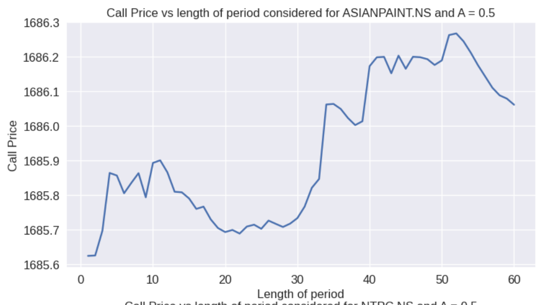


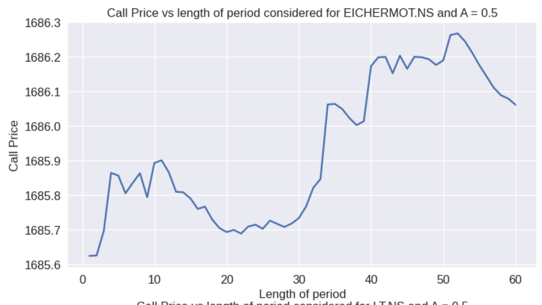


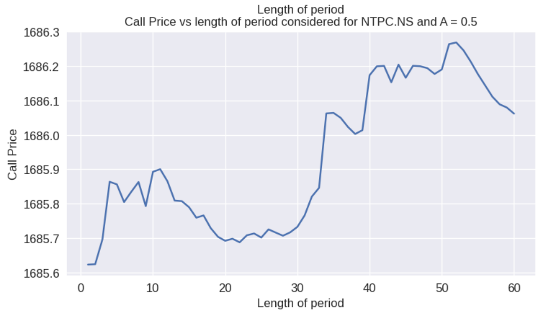


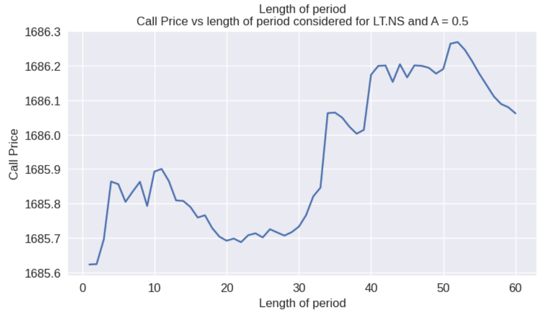


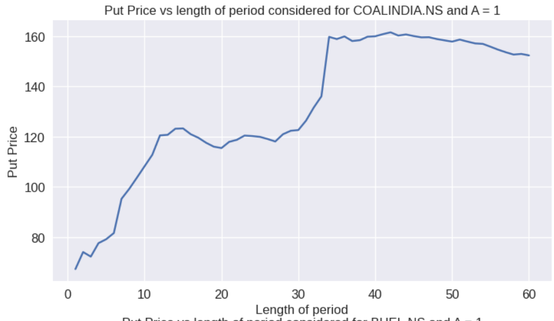


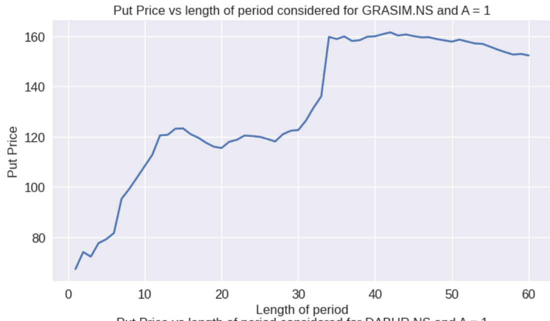


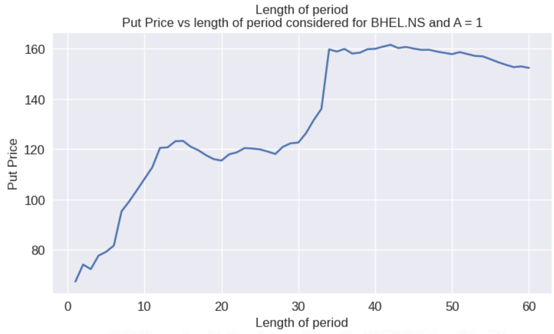


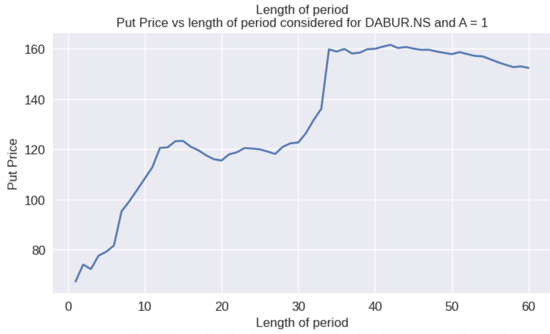


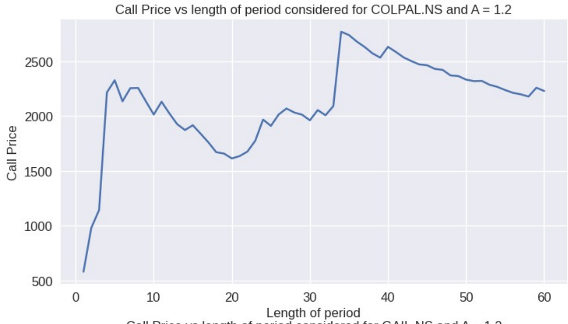


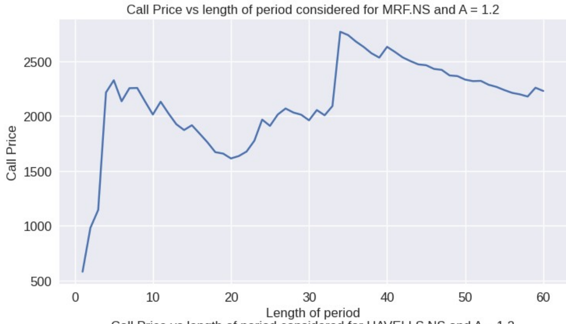

Put Price vs length of period considered for COALINDIA.NS and A = 1
Put Price
Length of period

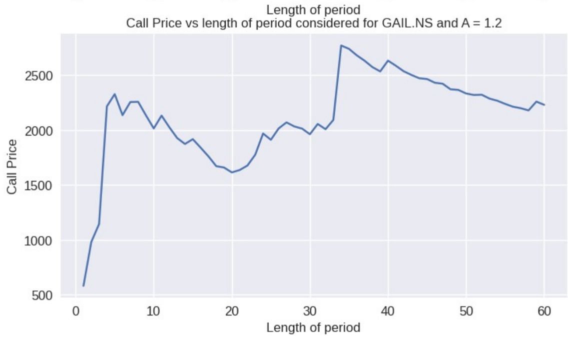

Put Price vs length of period considered for GRASIM.NS and A = 1
Put Price
Length of period

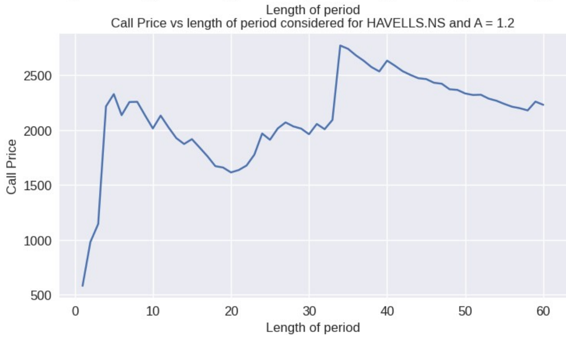

Put Price vs length of period considered for BHEL.NS and A = 1
Put Price
Length of period

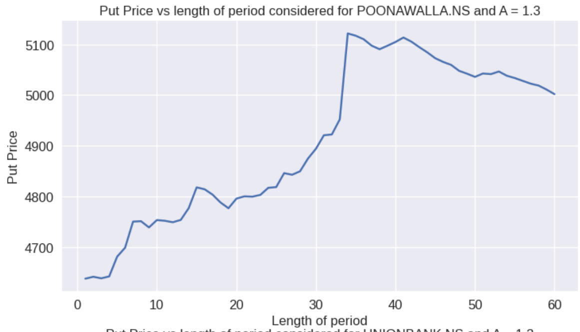

Put Price vs length of period considered for DABUR.NS and A = 1
Put Price
Length of period

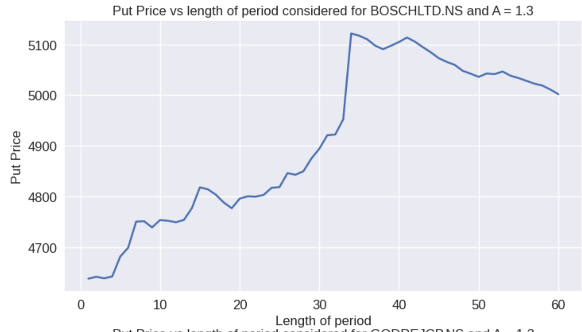

Call Price vs length of period considered for COLPAL.NS and A = 1.2
Call Price
Length of period

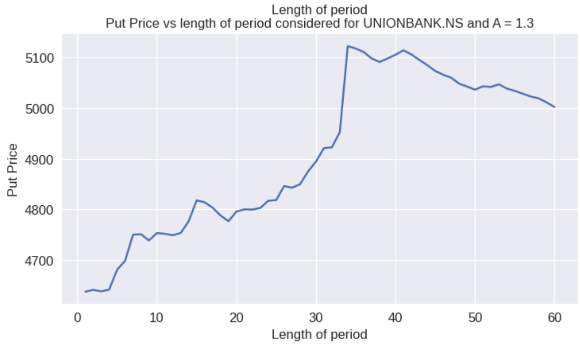

Call Price vs length of period considered for MRF.NS and A = 1.2
Call Price
Length of period

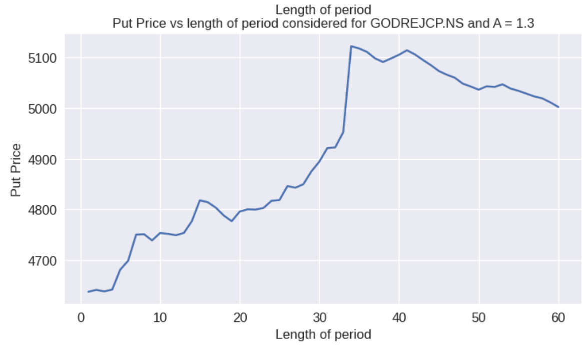

Call Price vs length of period considered for GAIL.NS and A = 1.2
Call Price
Length of period

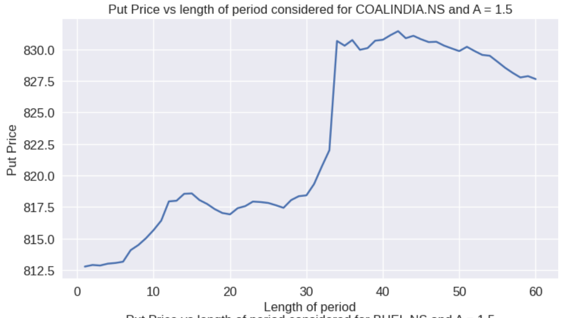

Call Price vs length of period considered for HAVELLS.NS and A = 1.2
Call Price
Length of period

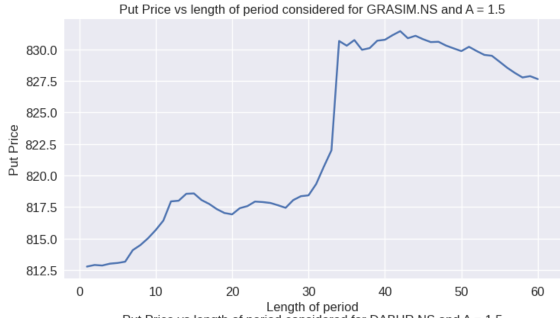

Put Price vs length of period considered for POONAWALLA.NS and A = 1.3
Put Price
Length of period

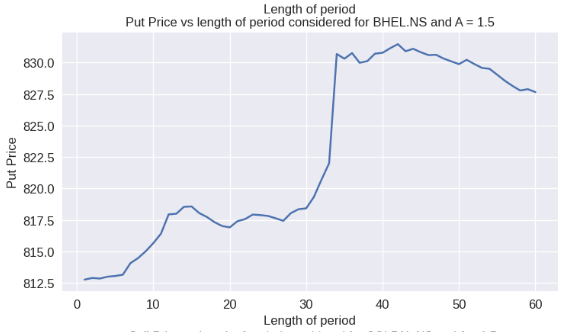

Put Price vs length of period considered for BOSCHLTD.NS and A = 1.3
Put Price
Length of period

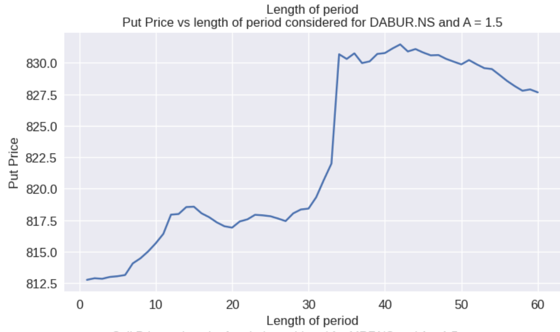

Put Price vs length of period considered for UNIONBANK.NS and A = 1.3
Put Price
Length of period

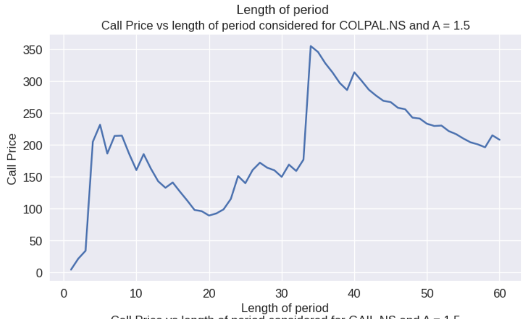

Put Price vs length of period considered for GODREJCP.NS and A = 1.3
Put Price
Length of period

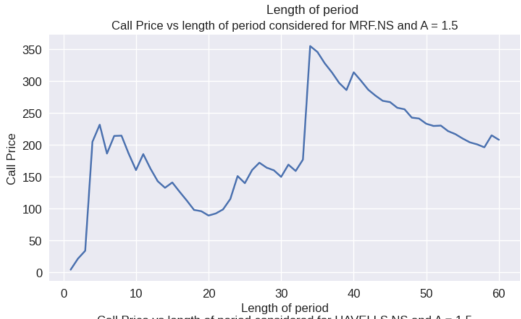

Put Price vs length of period considered for COALINDIA.NS and A = 1.5
Put Price
Length of period

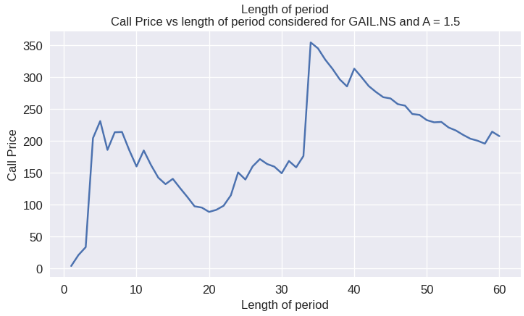

Put Price vs length of period considered for GRASIM.NS and A = 1.5
Put Price
Length of period

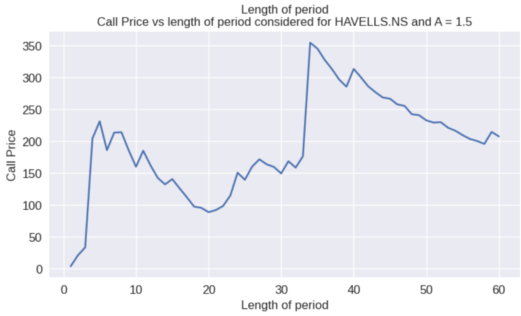

Put Price vs length of period considered for BHEL.NS and A = 1.5
Put Price
Length of period

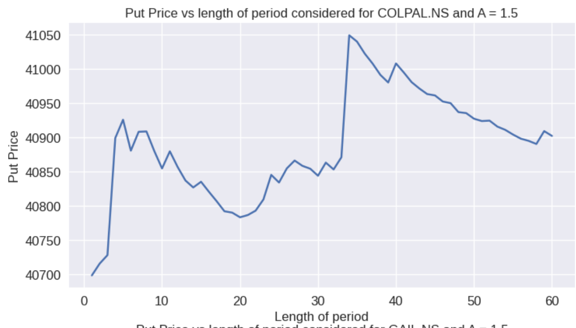

Put Price vs length of period considered for DABUR.NS and A = 1.5
Put Price
Length of period

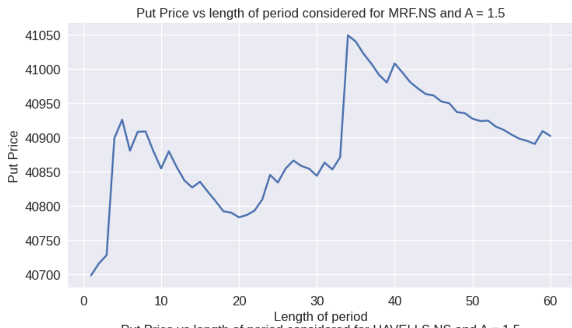

Call Price vs length of period considered for COLPAL.NS and A = 1.5
Call Price
Length of period

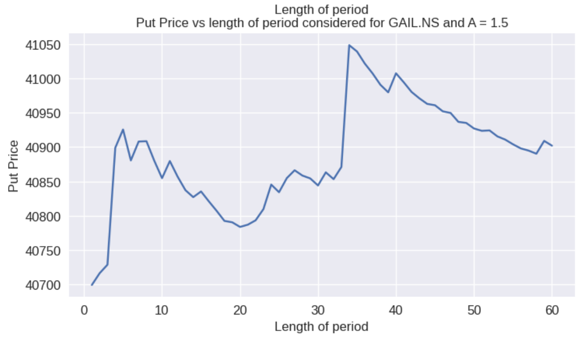

Call Price vs length of period considered for MRF.NS and A = 1.5
Call Price
Length of period

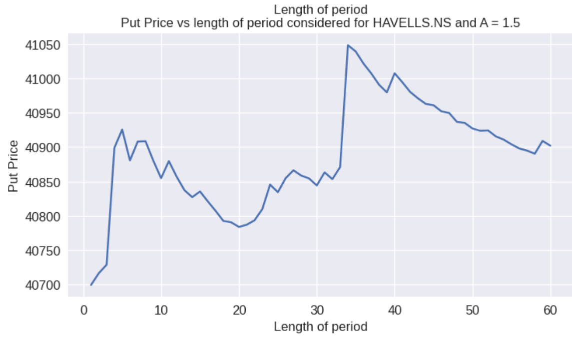

Call Price vs length of period considered for GAIL.NS and A = 1.5
Call Price
Length of period


Call Price vs length of period considered for HAVELLS.NS and A = 1.5
Call Price
Length of period


Put Price vs length of period considered for COLPAL.NS and A = 1.5
Put Price
Length of period


Put Price vs length of period considered for MRF.NS and A = 1.5
Put Price
Length of period


Put Price vs length of period considered for GAIL.NS and A = 1.5
Put Price
Length of period


Put Price vs length of period considered for HAVELLS.NS and A = 1.5
Put Price
Length of period