MA 374 Lab 8

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Q1

```
PS C:\Users\amanb\Desktop\sem 6\fe lab\lab 8> python q1.py
 Historical Volatility of last month for BSE
```

SNo	Stock Name	Historical Volatility
1	Sensex	0.106738
2	TATASTEEL.NS	0.29654
3	HDFCBANK.NS	0.181845
4	INFY.NS	0.214321
5	ICICIBANK.NS	0.148203
6	SBIN.NS	0.216933
7	RELIANCE.NS	0.179259
8	ITC.NS	0.158825
9	HINDUNILVR.NS	0.185782
10	WIPRO.NS	0.170772
11	BAJFINANCE.NS	0.154052
12	PFS.NS	0.437709
13	SYNGENE.NS	0.194608
14	DIXON.NS	0.243161
15	MUTHOOTCAP.NS	0.476794
16	THYROCARE.NS	0.505683
17	IEX.NS	0.325981
18	LALPATHLAB.NS	0.352872
19	SHRIRAMCIT.NS	0.205682
20	NETWORK18.NS	0.471499
21	PVR.NS	0.300127

Historical Volatility of last month for NSE

SNo	Stock Name	Historical Volatility
1	NIFTY50	0.106241
2	ADANIPORTS.NS	0.299188
3	ASIANPAINT.NS	0.153425
4	BAJAJFINSV.NS	0.230938
5	BAJFINANCE.NS	0.154052
6	DIVISLAB.NS	0.293618
7	HDFCLIFE.NS	0.191143
8	HINDUNILVR.NS	0.185782
9	NESTLEIND.NS	0.144625
10	POWERGRID.NS	0.209716
11	TATACONSUM.NS	0.164261
12	GNFC.NS	0.425755
13	INDIANB.NS	0.451034
14	NIACL.NS	0.726274
15	RTNPOWER.NS	0.306865
16	HSCL.NS	0.417661
17	SPTL.NS	0.553059
18	GPPL.NS	0.366518
19	CHENNPETRO.NS	0.387444
20	AVANTIFEED.NS	0.321179
21	GTLINFRA.NS	0.589905

Q2

There are too many stocks in our data, I am attaching screenshots for the first 5 stocks in this report. One may run the python code to see the output for the rest of the stocks

BSE:

```
For TATASTEEL.NS
Historical volatility for last 1 month  = 0.3593859699978482

+--------------------+---------------+---------------+
| Strike price (K)   |   Call Option |   Put Option  |
+====================+===============+===============+
| 0.5*S0             |      57.7295  |    0.0138446  |
+--------------------+---------------+---------------+
| 0.6*S0             |      46.8663  |    0.137464   |
+--------------------+---------------+---------------+
| 0.7*S0             |      36.4281  |    0.686162   |
+--------------------+---------------+---------------+
| 0.8*S0             |      26.9468  |    2.19174    |
+--------------------+---------------+---------------+
| 0.9*S0             |      18.9451  |    5.17692    |
+--------------------+---------------+---------------+
| 1.0*S0             |      12.6941  |    9.91272    |
+--------------------+---------------+---------------+
| 1.1*S0             |       8.14829 |   16.3538     |
+--------------------+---------------+---------------+
| 1.2*S0             |       5.04147 |   24.2339     |
+--------------------+---------------+---------------+
| 1.3*S0             |       3.02506 |   33.2043     |
+--------------------+---------------+---------------+
| 1.4*S0             |       1.77029 |   42.9364     |
+--------------------+---------------+---------------+
| 1.5*S0             |       1.0154  |   53.1684     |
+--------------------+---------------+---------------+
```

```
For HDFCBANK.NS
Historical volatility for last 1 month  = 0.129933487145134 78

+--------------------+---------------+----------------+
| Strike price (K)   |   Call Option |    Put Option  |
+====================+===============+================+
| 0.5*S0             | 834.175       |   3.51805e-14  |
+--------------------+---------------+----------------+
| 0.6*S0             | 675.38        |   5.0905e-08   |
+--------------------+---------------+----------------+
| 0.7*S0             | 516.585       |   0.000440595  |
+--------------------+---------------+----------------+
| 0.8*S0             | 357.929       |   0.139573     |
+--------------------+---------------+----------------+
| 0.9*S0             | 203.92        |   4.92557      |
+--------------------+---------------+----------------+
| 1.0*S0             |  81.1858      |  40.9867       |
+--------------------+---------------+----------------+
| 1.1*S0             |  19.7805      | 138.376        |
+--------------------+---------------+----------------+
| 1.2*S0             |   2.86963     | 280.261        |
+--------------------+---------------+----------------+
| 1.3*S0             |   0.259612    | 436.446        |
+--------------------+---------------+----------------+
| 1.4*S0             |   0.0157266   | 594.997        |
+--------------------+---------------+----------------+
| 1.5*S0             |   0.000684952 | 753.777        |
+--------------------+---------------+----------------+
```

For INFY.NS
Historical volatility for last 1 month = 0.18656799133977636

Strike price (K)	Call Option	Put Option
0.5*S0	772.719	6.26007e-07
0.6*S0	625.623	0.000824464
0.7*S0	478.617	0.0910039
0.8*S0	333.468	2.03756
0.9*S0	200.197	15.8627
1.0*S0	98.3588	61.1212
1.1*S0	38.6627	148.521
1.2*S0	12.2445	269.199
1.3*S0	3.19896	407.25
1.4*S0	0.709627	551.857
1.5*S0	0.137479	698.381

For ICICIBANK.NS
Historical volatility for last 1 month = 0.1558191012100866

Strike price (K)	Call Option	Put Option
0.5*S0	456.423	3.585e-10
0.6*S0	369.537	8.27622e-06
0.7*S0	282.657	0.00546085
0.8*S0	196.131	0.364424
0.9*S0	114.215	5.33464
1.0*S0	50.6423	28.6472
1.1*S0	16.0961	80.9864
1.2*S0	3.657	155.433
1.3*S0	0.61381	239.275
1.4*S0	0.0796211	325.626
1.5*S0	0.00834735	412.441

```
For SBIN.NS
Historical volatility for last 1 month  = 0.24267481703420035
```

Strike price (K)	Call Option	Put Option
0.5*S0	314.426	0.000226967
0.6*S0	254.591	0.019771
0.7*S0	195.112	0.395609
0.8*S0	137.933	3.07112
0.9*S0	87.7061	12.699
1.0*S0	49.4568	34.3045
1.1*S0	24.7275	69.4299
1.2*S0	11.0685	115.626
1.3*S0	4.49915	168.911
1.4*S0	1.68611	225.953
1.5*S0	0.590918	284.712

NSE:

```
For ASIANPAINT.NS
Historical volatility for last 1 month  = 0.16472665463742894
```

Strike price (K)	Call Option	Put Option
0.5*S0	1582.07	1.36245e-08
0.6*S0	1280.9	0.000116254
0.7*S0	979.78	0.0412419
0.8*S0	680.459	1.88644
0.9*S0	399.642	22.2355
1.0*S0	183.005	106.764
1.1*S0	62.4113	287.337
1.2*S0	15.8729	541.964
1.3*S0	3.10133	830.359
1.4*S0	0.484169	1128.91
1.5*S0	0.0627849	1429.65

For BAJAJFINSV.NS
Historical volatility for last 1 month = 0.2343830326814358

Strike price (K)	Call Option	Put Option
0.5*S0	793.034	0.000276938
0.6*S0	642.102	0.0320462
0.7*S0	491.874	0.767314
0.8*S0	346.809	6.66618
0.9*S0	218.702	29.5219
1.0*S0	121.214	82.9976
1.1*S0	58.941	171.688
1.2*S0	25.3905	289.101
1.3*S0	9.83866	424.512
1.4*S0	3.48639	569.123
1.5*S0	1.1475	717.748

For BAJFINANCE.NS
Historical volatility for last 1 month = 0.15471466570171905

Strike price (K)	Call Option	Put Option
0.5*S0	3368.77	1.9122e-09
0.6*S0	2727.49	5.05484e-05
0.7*S0	2086.24	0.0362903
0.8*S0	1447.46	2.54925
0.9*S0	842.055	38.427
1.0*S0	371.813	209.471
1.1*S0	117.077	596.02
1.2*S0	26.199	1146.43
1.3*S0	4.3079	1765.82
1.4*S0	0.544935	2403.35
1.5*S0	0.0555035	3044.14

For DIVISLAB.NS
Historical volatility for last 1 month = 0.23123742472590242

Strike price (K)	Call Option	Put Option
0.5*S0	1748.74	0.000454941
0.6*S0	1415.9	0.0591001
0.7*S0	1084.47	1.52232
0.8*S0	763.901	13.8437
0.9*S0	480.198	63.0325
1.0*S0	264.345	180.073
1.1*S0	127.118	375.739
1.2*S0	53.9209	635.434
1.3*S0	20.4935	934.9
1.4*S0	7.09897	1254.4
1.5*S0	2.2777	1582.47

For HDFCLIFE.NS
Historical volatility for last 1 month = 0.1285766191321198

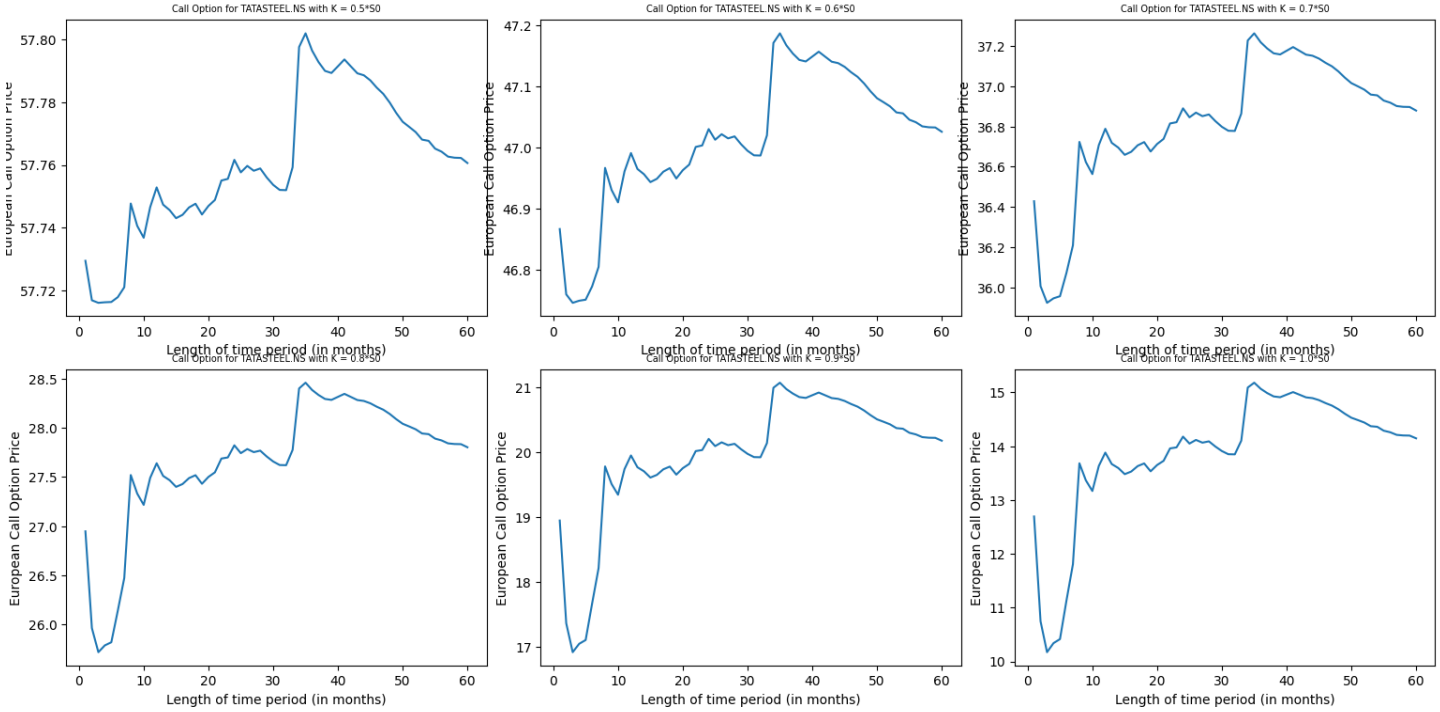
Strike price (K)	Call Option	Put Option
0.5*S0	290.115	6.20667e-15
0.6*S0	234.888	1.19776e-08
0.7*S0	179.662	0.000123973
0.8*S0	124.478	0.0437442
0.9*S0	70.8474	1.6397
1.0*S0	28.0294	14.0487
1.1*S0	6.71258	47.9587
1.2*S0	0.944776	97.4179
1.3*S0	0.0819246	151.782
1.4*S0	0.00470844	206.932
1.5*S0	0.000192956	262.154

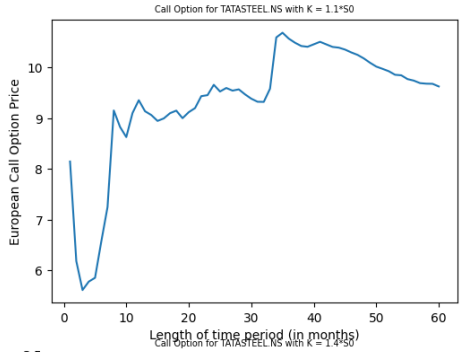
Q3

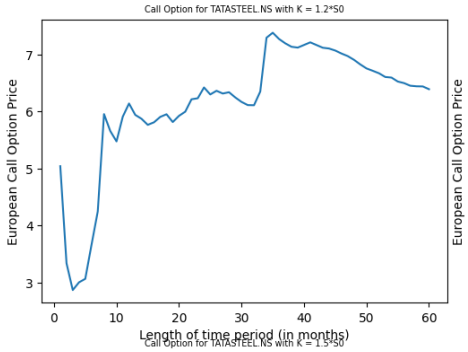
Again there are too many stocks in our data, I am attaching screenshots for the first 2 stocks of both bse/nse in this report. One may run the python code to see the output for the rest of the stocks. Since the quality of the pics is low in this report, I am submitting a folder of these images also

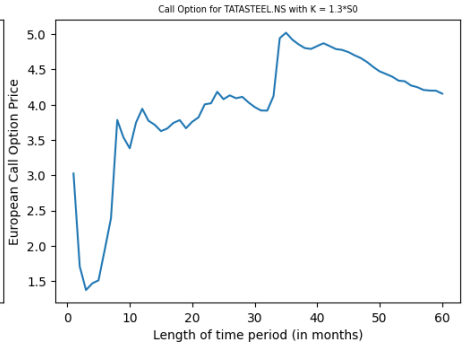
BSE:

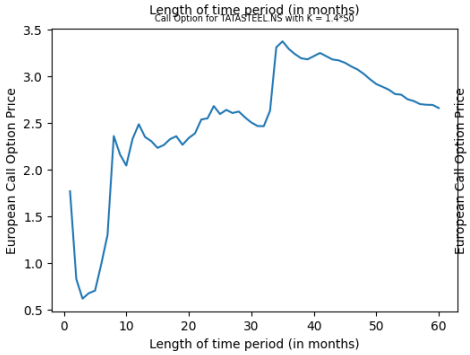
1) TATASTEEL
    a) Call Option

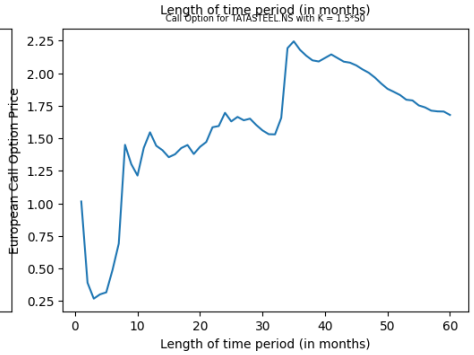



Call Option for TATASTEEL.NS with K = 1.1*S0
European Call Option Price
Length of time period (in months)

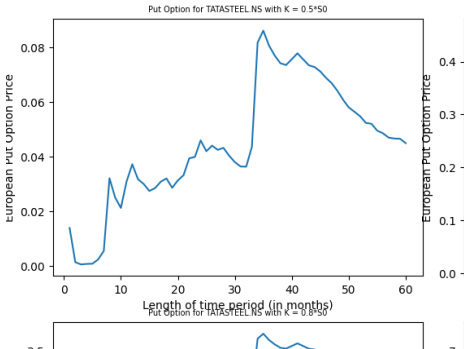

Call Option for TATASTEEL.NS with K = 1.2*S0
European Call Option Price
Length of time period (in months)

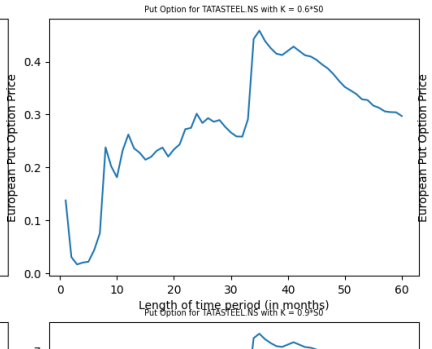

Call Option for TATASTEEL.NS with K = 1.3*S0
European Call Option Price
Length of time period (in months)

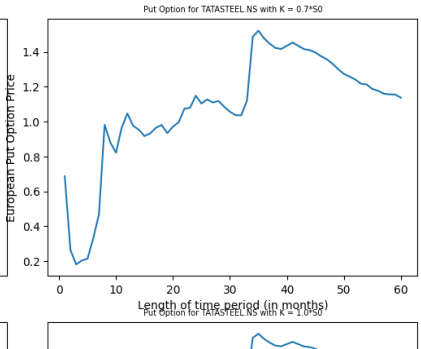

Call Option for TATASTEEL.NS with K = 1.4*S0
European Call Option Price
Length of time period (in months)

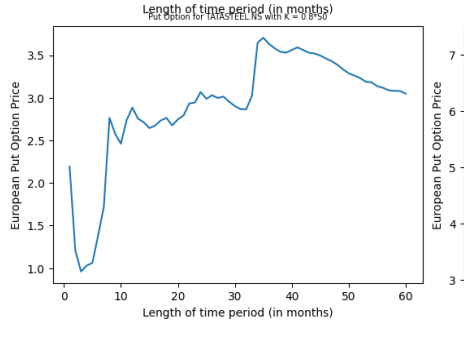

Call Option for TATASTEEL.NS with K = 1.5*S0
European Call Option Price
Length of time period (in months)

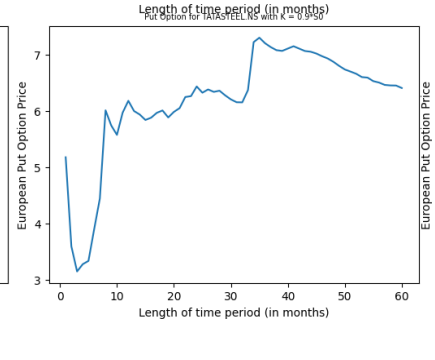
b) Put Option

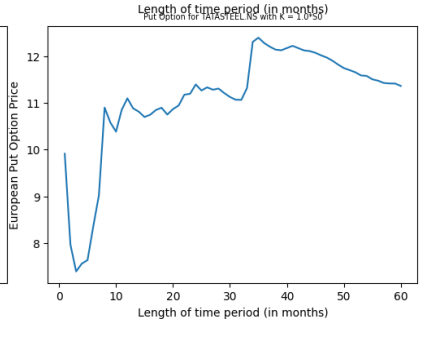

Put Option for TATASTEEL.NS with K = 0.5*S0
European Put Option Price
Length of time period (in months)

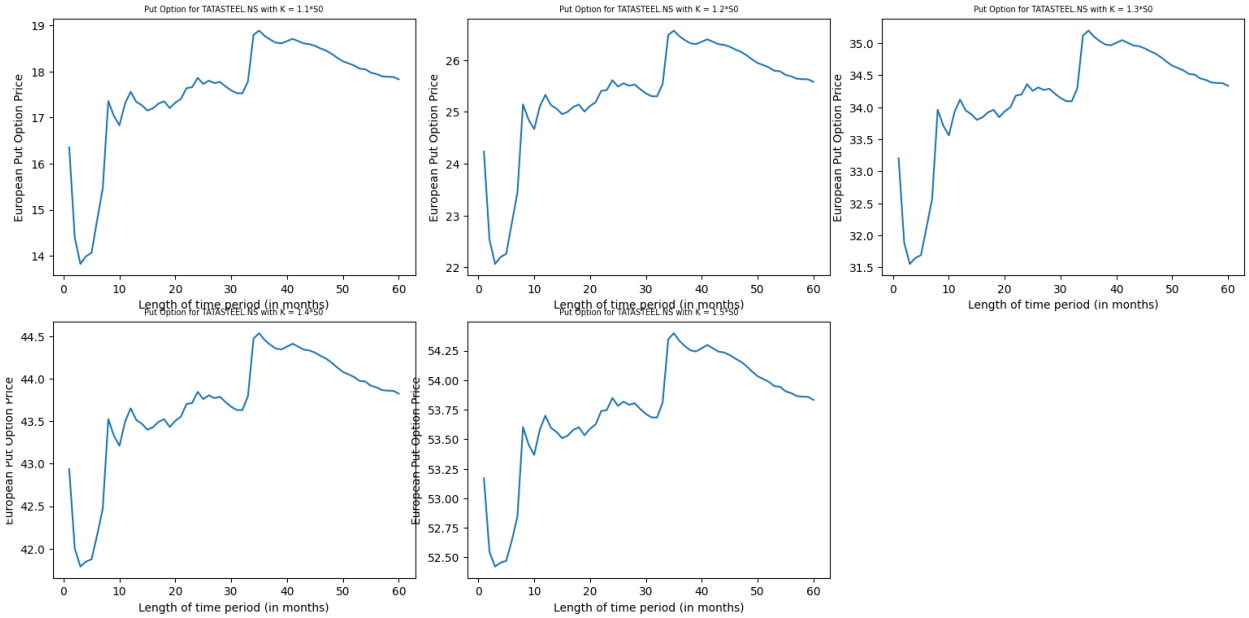

Put Option for TATASTEEL.NS with K = 0.6*S0
European Put Option Price
Length of time period (in months)


Put Option for TATASTEEL.NS with K = 0.7*S0
European Put Option Price
Length of time period (in months)

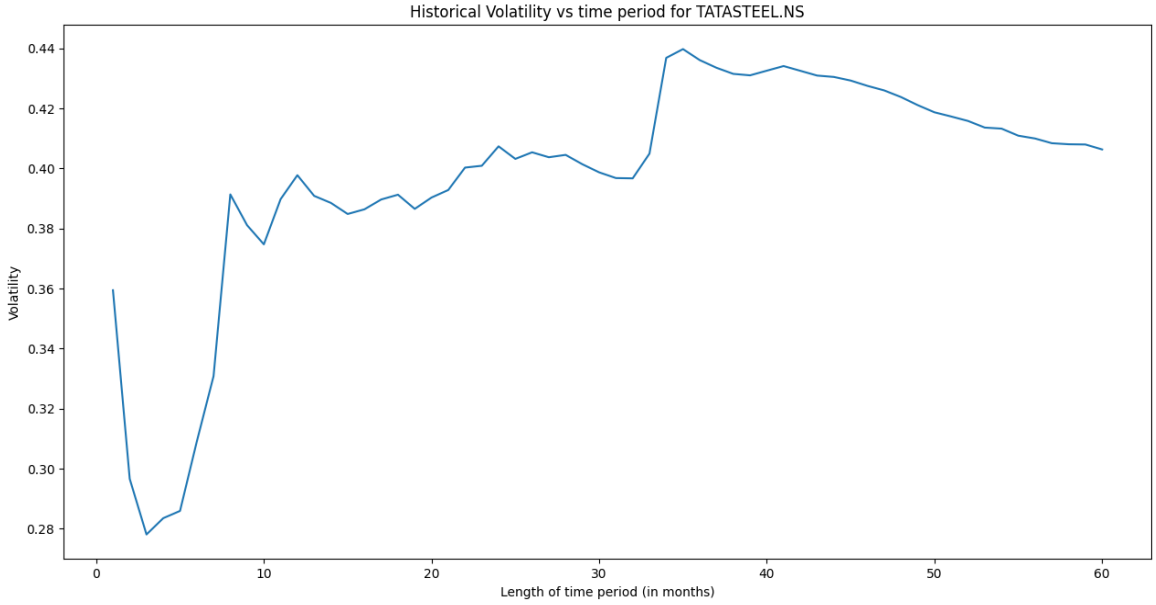

Put Option for TATASTEEL.NS with K = 0.8*S0
European Put Option Price
Length of time period (in months)


Put Option for TATASTEEL.NS with K = 0.9*S0
European Put Option Price
Length of time period (in months)


Put Option for TATASTEEL.NS with K = 1.0*S0
European Put Option Price
Length of time period (in months)

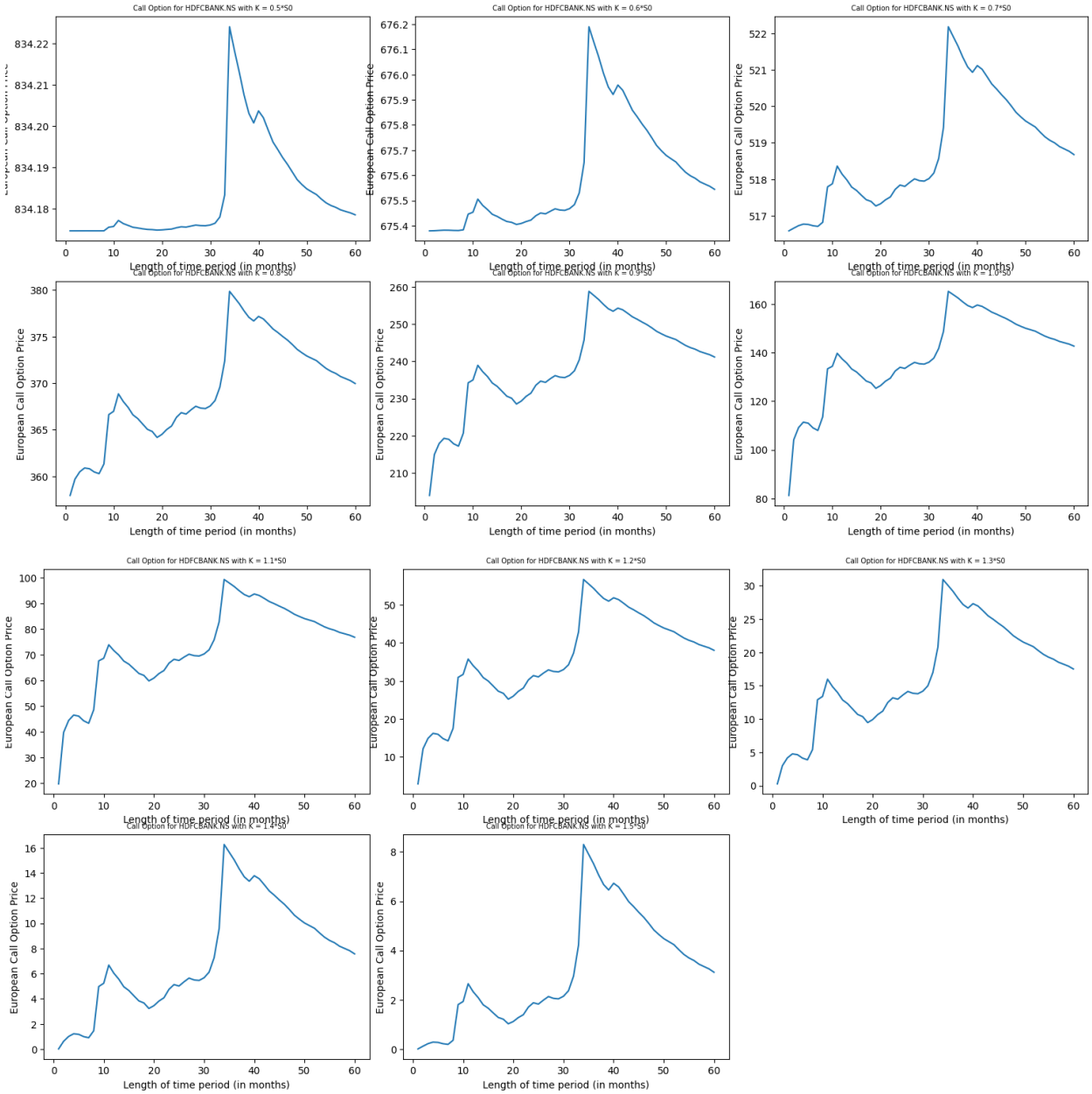


c) Volatility Graph

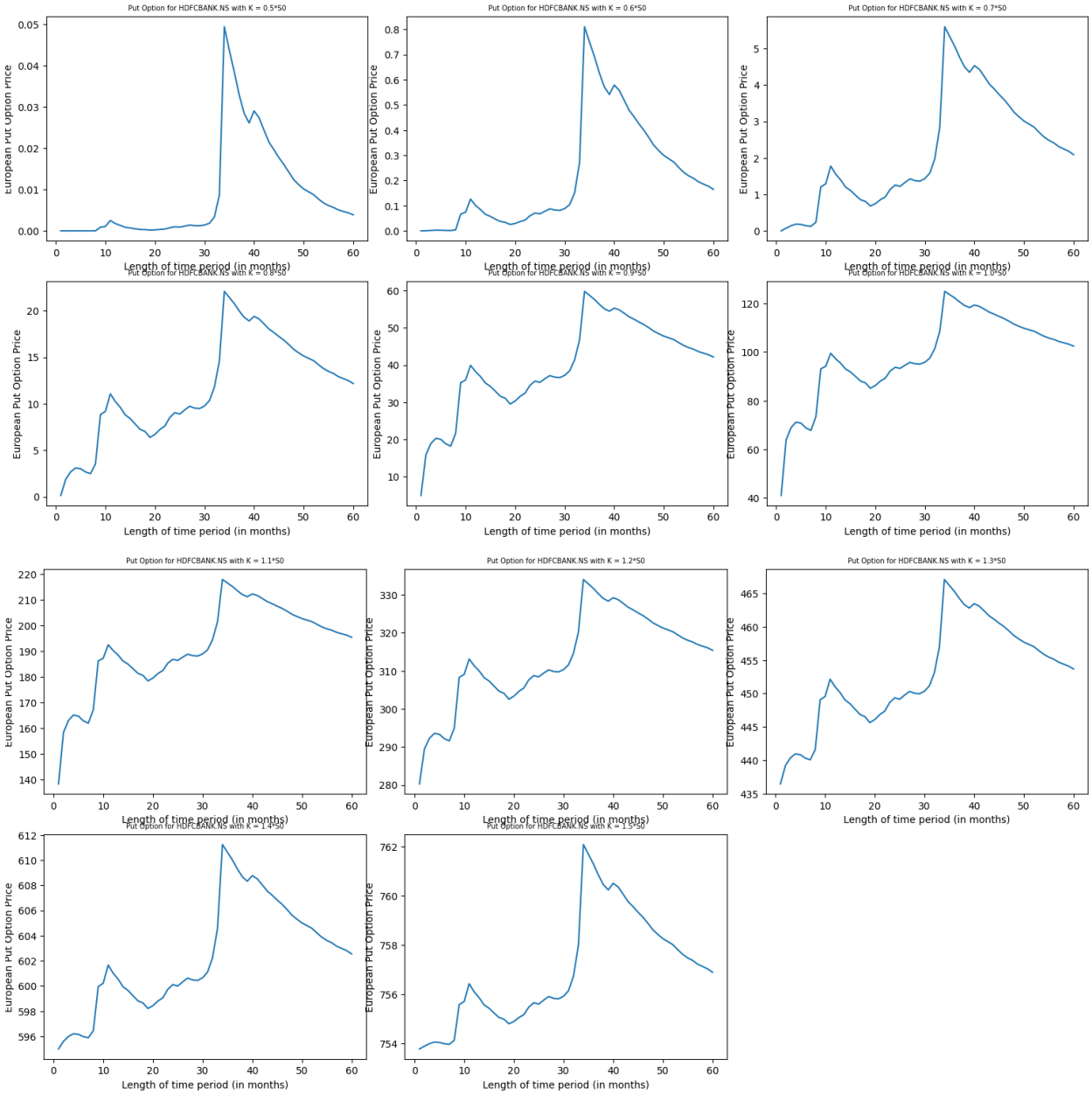


2) HDFC BANK

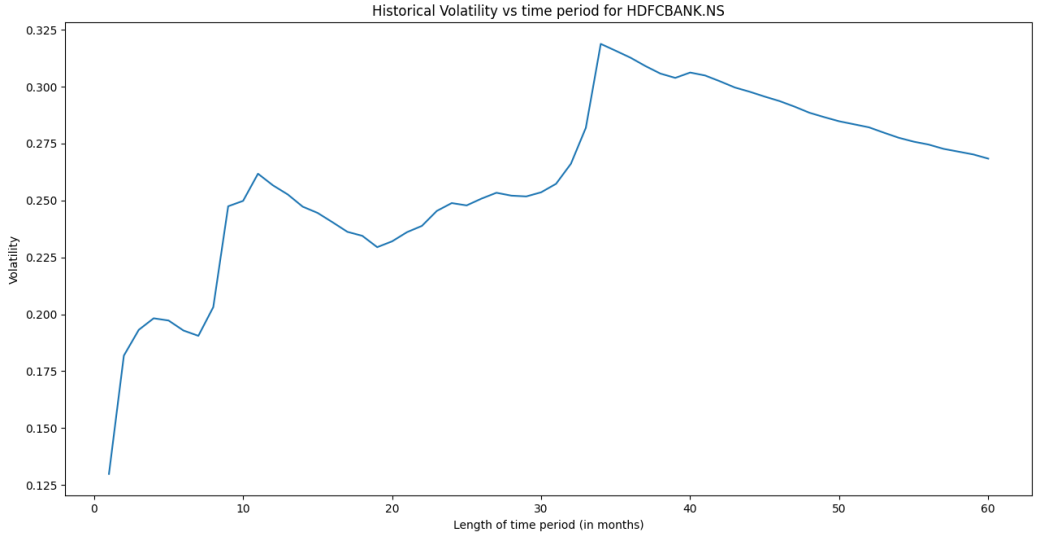
a) Call Option


Call Option for HDFCBANK.NS with K = 0.5*S0
Call Option for HDFCBANK.NS with K = 0.6*S0
Call Option for HDFCBANK.NS with K = 0.7*S0
Call Option for HDFCBANK.NS with K = 0.8*S0
Call Option for HDFCBANK.NS with K = 0.9*S0
Call Option for HDFCBANK.NS with K = 1.0*S0
Call Option for HDFCBANK.NS with K = 1.1*S0
Call Option for HDFCBANK.NS with K = 1.2*S0
Call Option for HDFCBANK.NS with K = 1.3*S0
Call Option for HDFCBANK.NS with K = 1.4*S0
Call Option for HDFCBANK.NS with K = 1.5*S0
European Call Option Price
Length of time period (in months)

b) Put Option



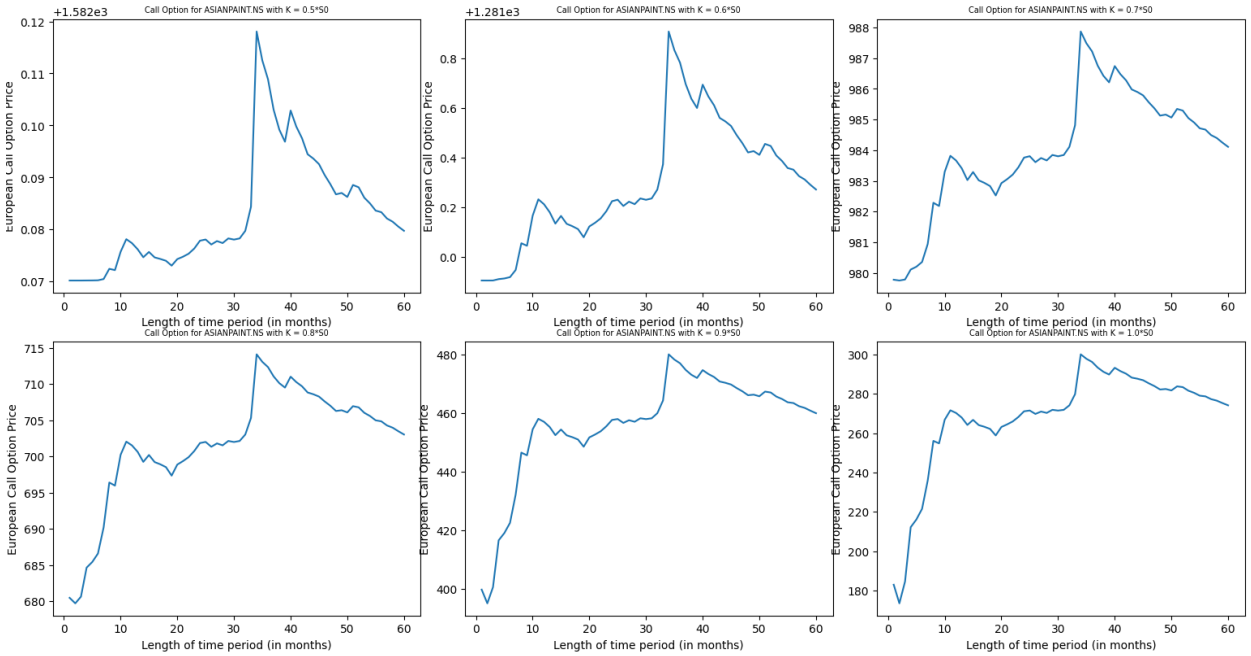
c) Volatility Graph

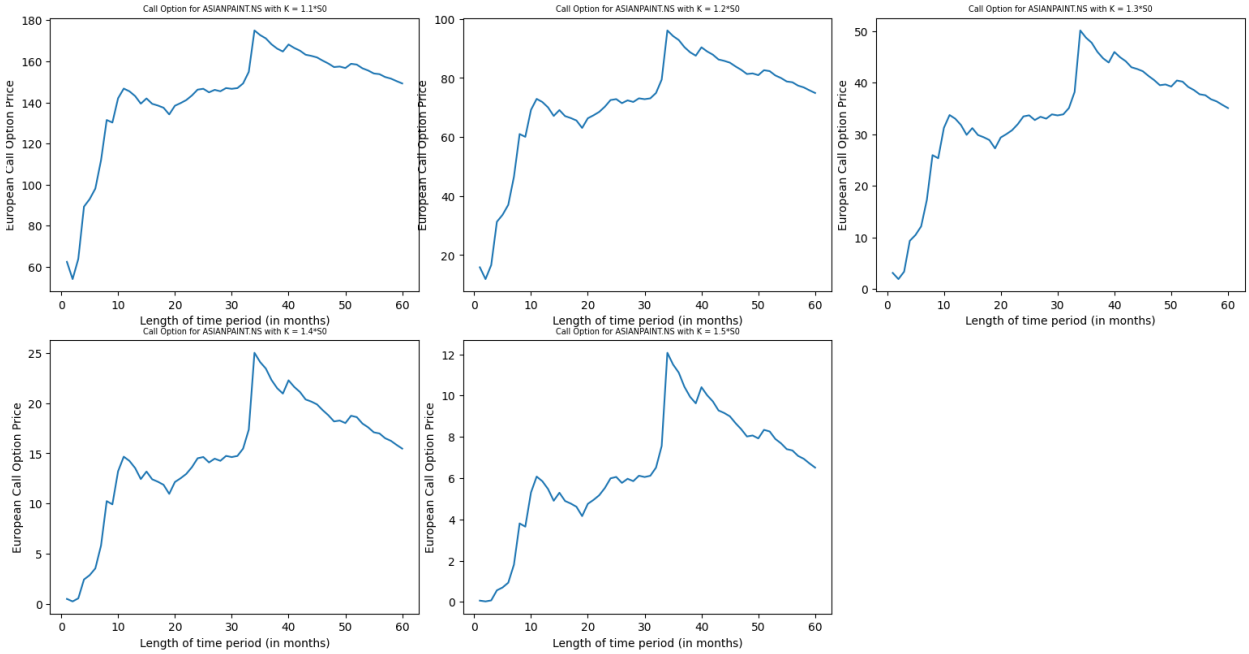


NSE:

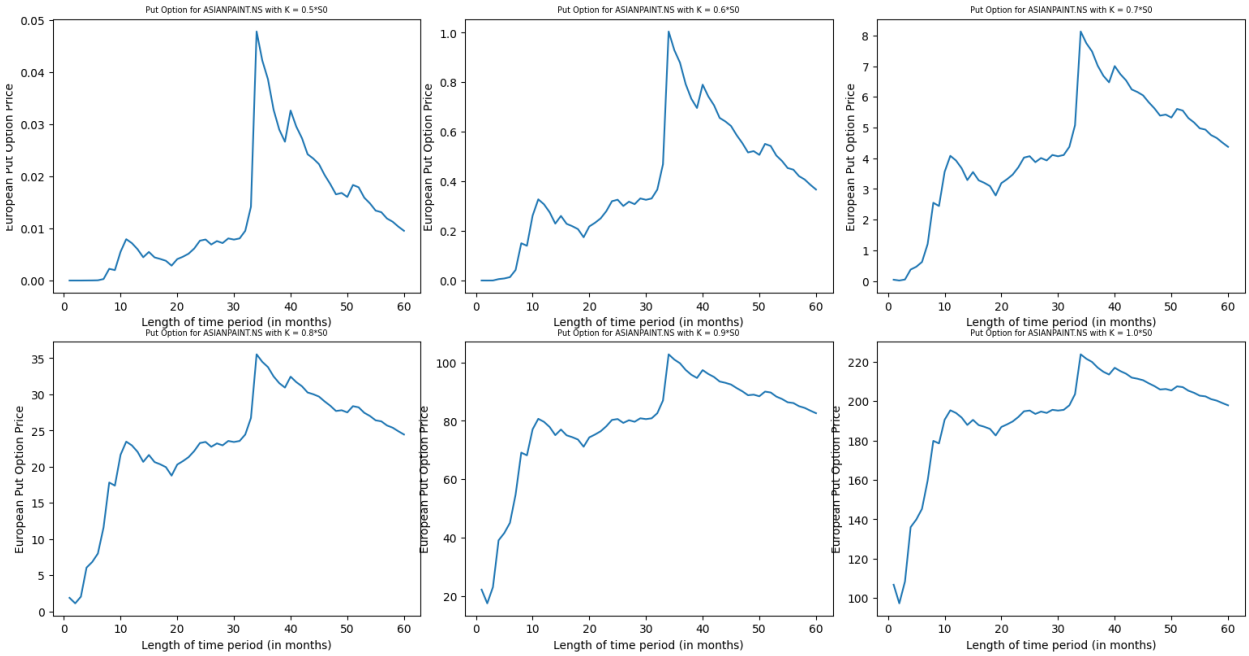
1) Asian Paints

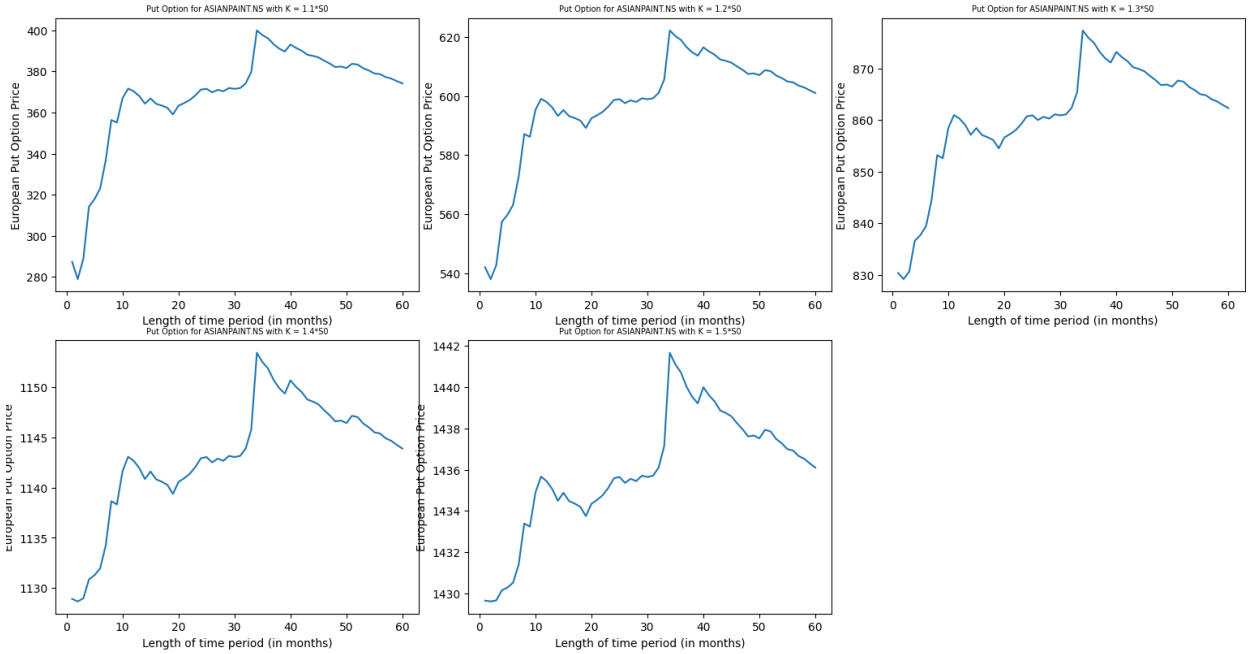
a) Call Option



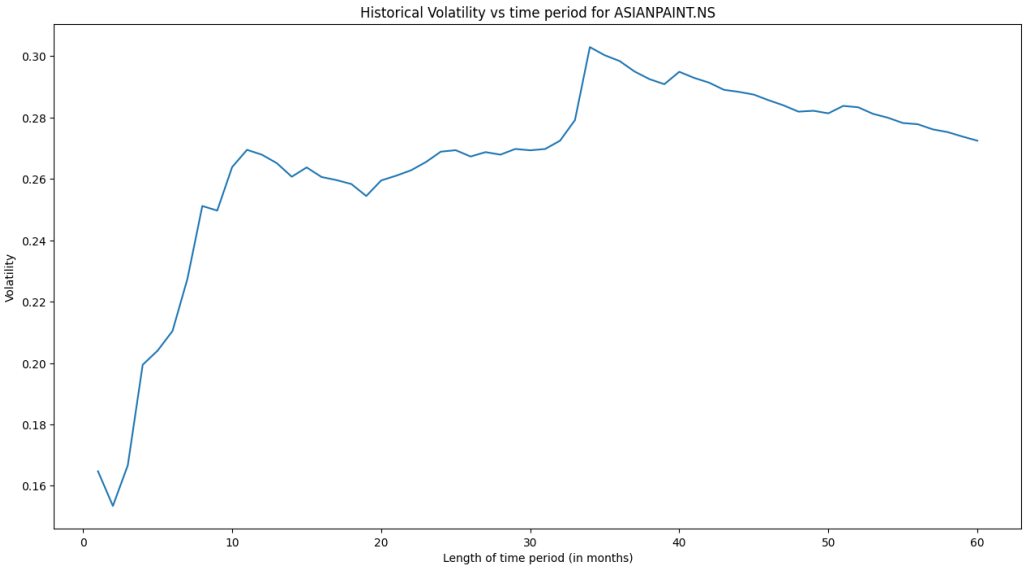

Call Option for ASIANPAINT.NS with K = 1.1*S0
Call Option for ASIANPAINT.NS with K = 1.2*S0
Call Option for ASIANPAINT.NS with K = 1.3*S0
Call Option for ASIANPAINT.NS with K = 1.4*S0
Call Option for ASIANPAINT.NS with K = 1.5*S0
European Call Option Price
Length of time period (in months)

b) Put Option


Put Option for ASIANPAINT.NS with K = 0.5*S0
Put Option for ASIANPAINT.NS with K = 0.6*S0
Put Option for ASIANPAINT.NS with K = 0.7*S0
Put Option for ASIANPAINT.NS with K = 0.8*S0
Put Option for ASIANPAINT.NS with K = 0.9*S0
Put Option for ASIANPAINT.NS with K = 1.0*S0
European Put Option Price
Length of time period (in months)

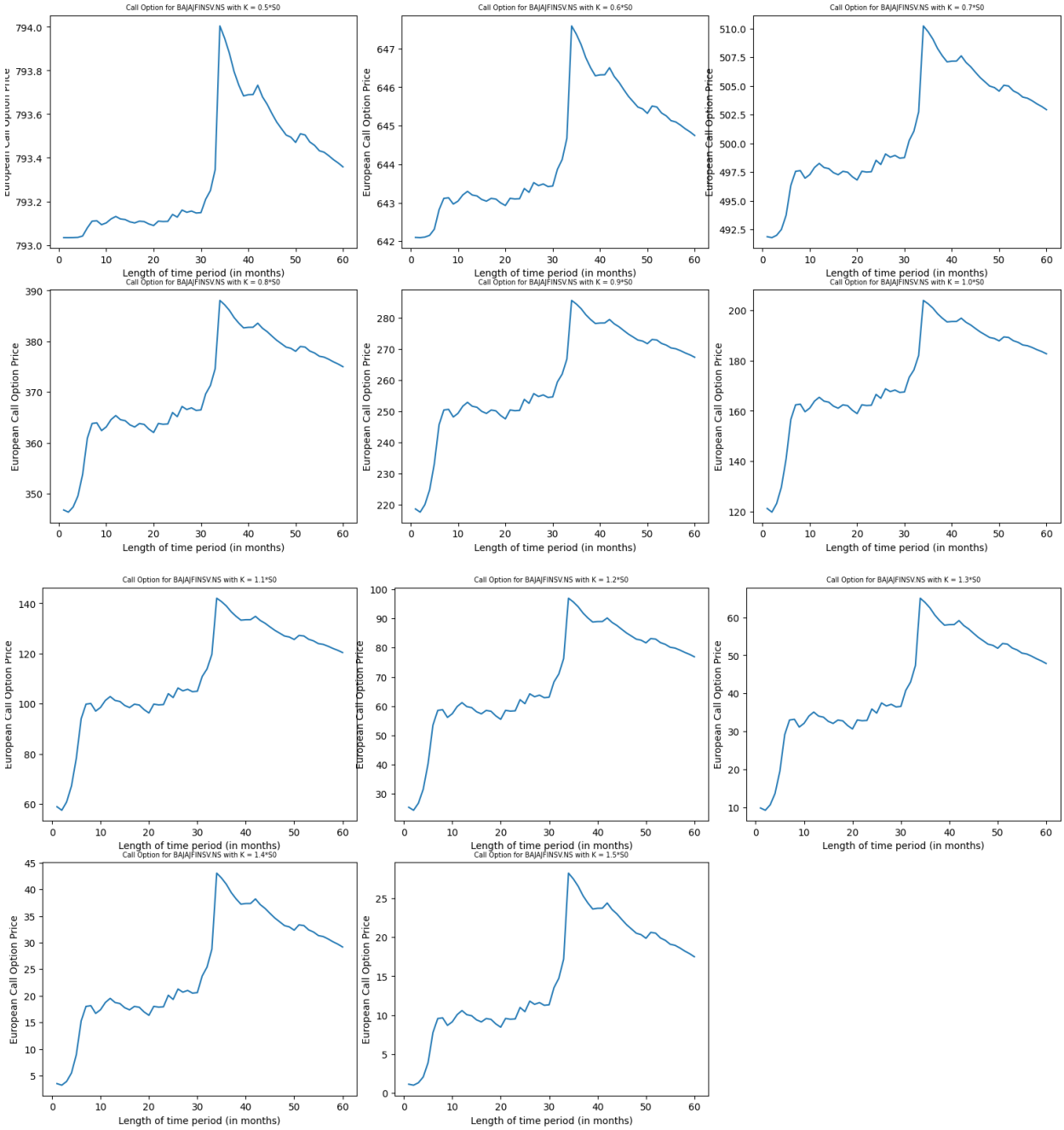


c) Volatility Graph

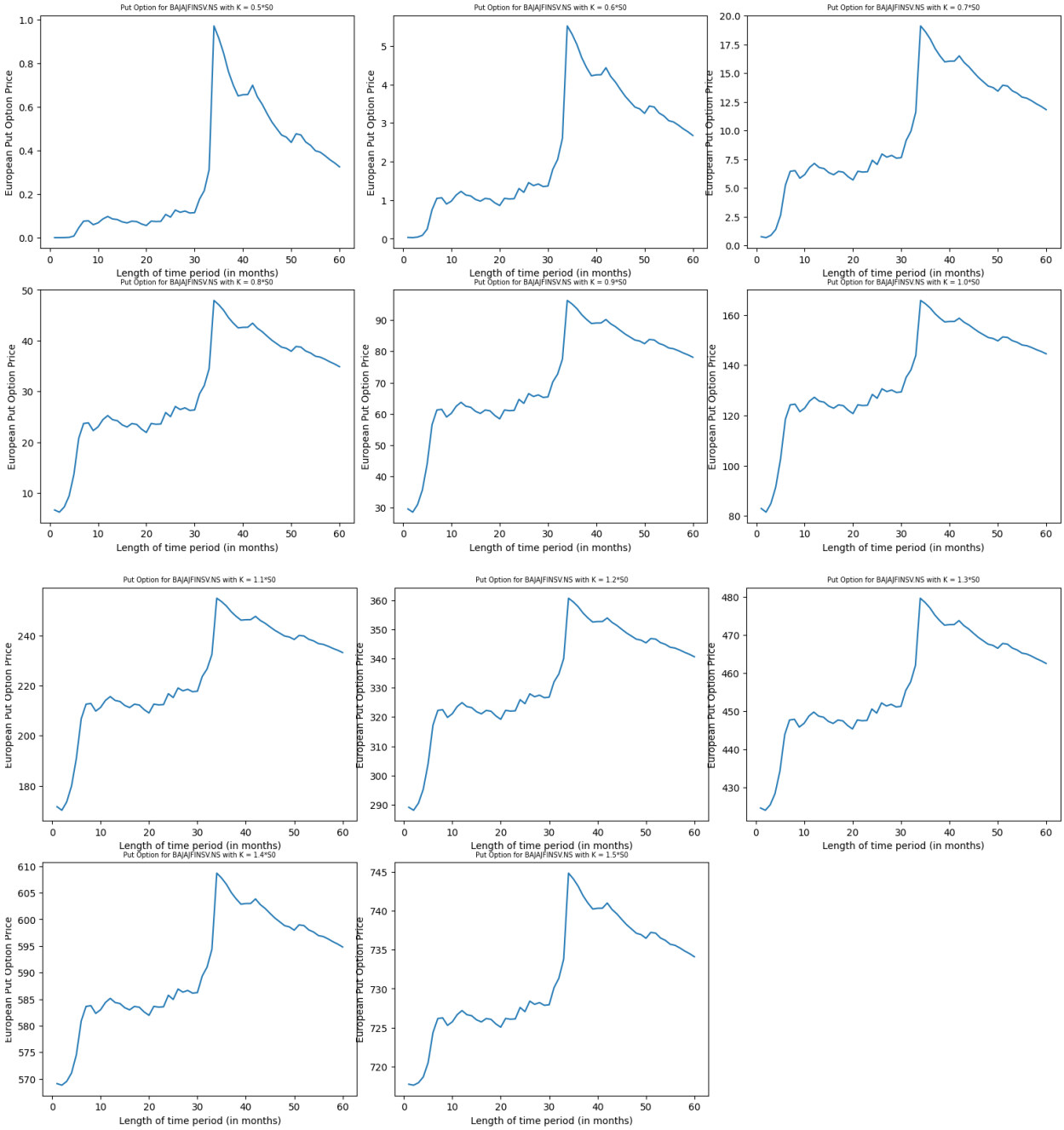


2) Bajaj Finance

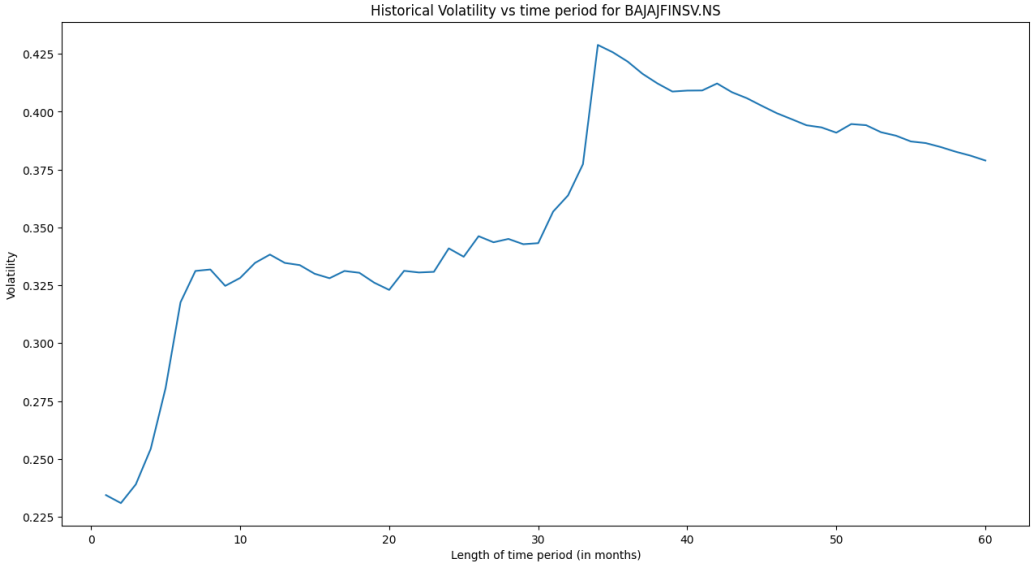
a) Call Option


Call Option for BAJAJFINSV.NS with K = 0.5*S0
Call Option for BAJAJFINSV.NS with K = 0.6*S0
Call Option for BAJAJFINSV.NS with K = 0.7*S0
Call Option for BAJAJFINSV.NS with K = 0.8*S0
Call Option for BAJAJFINSV.NS with K = 0.9*S0
Call Option for BAJAJFINSV.NS with K = 1.0*S0
Call Option for BAJAJFINSV.NS with K = 1.1*S0
Call Option for BAJAJFINSV.NS with K = 1.2*S0
Call Option for BAJAJFINSV.NS with K = 1.3*S0
Call Option for BAJAJFINSV.NS with K = 1.4*S0
Call Option for BAJAJFINSV.NS with K = 1.5*S0
European Call Option Price
Length of time period (in months)

b) Put Option



c) Volatility Graph


Historical Volatility vs time period for BAJAJFINSV.NS
Volatility
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0
10
20
30
40
50
60
Length of time period (in months)