

# MA-374 Lab Assignment 8

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## Question 1

From 2-11 we have stocks included in BSE index

From 12-21 we have stocks not included in BSE index

Historical Volatility of last month for BSE		
SNo	Stock Name	Historical Volatility
1	Sensex	0.115993
2	WIPRO.BO	0.314658
3	BAJAJ-AUTO.BO	0.243025
4	HDFCBANK.BO	0.156845
5	HEROMOTOCO.BO	0.228664
6	TCS.BO	0.238266
7	INFY.BO	0.280073
8	BAJFINANCE.BO	0.200697
9	MARUTI.BO	0.143204
10	RELIANCE.BO	0.132343
11	TATAMOTORS.BO	0.245847
12	ZOMATO.BO	0.356281
13	ZEEL.BO	0.472192
14	TVSMOTOR.BO	0.222727
15	PIDILITIND.BO	0.156255
16	NAUKRI.BO	0.336368
17	IRCTC.BO	0.596426
18	DLF.BO	0.275793
19	COLPAL.BO	0.224296
20	MFSL.BO	0.268427
21	BANKBARODA.BO	0.242934

From 2-11 we have stocks included in NSE index

From 12-21 we have stocks not included in NSE index

Historical Volatility of last month for NSE

SNo	Stock Name	Historical Volatility
1	NIFTY50	0.115479
2	ACC.NS	0.453015
3	GODREJIND.NS	0.246018
4	HINDZINC.NS	0.263605
5	IDEA.NS	0.834786
6	IGL.NS	0.187985
7	LUPIN.NS	0.262306
8	MAHABANK.NS	0.306306
9	MGL.NS	0.258028
10	PAGEIND.NS	0.151193
11	TATACHEM.NS	0.351653
12	HAVELLS.NS	0.155763
13	HAL.NS	0.355037
14	ICICIGI.NS	0.136516
15	ICICIPRULI.NS	0.239101
16	AMBUJACEM.NS	0.465468
17	IOC.NS	0.370175
18	NAUKRI.NS	0.337715
19	INDIGO.NS	0.24081
20	JINDALSTEL.NS	0.324271
21	BANKBARODA.NS	0.239861

## Question 2

Using the final price of the stock price in the data as  $S_0$ , and taking  $r = 0.05$ ,  $t = 0$ ,  $\sigma =$  from the last 1 month's data and various prices of  $K$ , the option prices are computed:

### i. For stocks in bsedata1:

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

For BAJFINANCE.BO  
Historical volatility for last 1 month = 0.2006966923496099

Strike price (K)	Call Option	Put Option
0.5*S0	3753.9	2.79597e-05
0.6*S0	3039.32	0.014976
0.7*S0	2325.64	0.940611
0.8*S0	1624.98	14.8801
0.9*S0	989.904	94.4025
1.0*S0	506.127	325.225
1.1*S0	214.27	747.968
1.2*S0	75.7648	1324.06
1.3*S0	22.8407	1985.74
1.4*S0	6.01406	2683.51
1.5*S0	1.41569	3393.51

For RELIANCE.BO  
Historical volatility for last 1 month = 0.13234255960166583

Strike price (K)	Call Option	Put Option
0.5*S0	1324.34	1.77358e-13
0.6*S0	1072.23	1.57276e-07
0.7*S0	820.13	0.00100421
0.8*S0	568.291	0.264788
0.9*S0	324.355	8.43181
1.0*S0	130.562	66.7415
1.1*S0	32.7669	221.05
1.2*S0	5.00595	445.392
1.3*S0	0.486814	692.976
1.4*S0	0.0322524	944.624
1.5*S0	0.00155805	1196.7

For MARUTI.BO

Historical volatility for last 1 month = 0.14320428172748592

Strike price (K)	Call Option	Put Option
0.5*S0	5276.85	6.52995e-11
0.6*S0	4272.34	8.57321e-06
0.7*S0	3267.84	0.0166934
0.8*S0	2265.46	2.14751
0.9*S0	1304.46	45.6533
1.0*S0	550.345	296.052
1.1*S0	155.714	905.932
1.2*S0	29.201	1783.93
1.3*S0	3.772	2763.01
1.4*S0	0.354843	3764.1
1.5*S0	0.0256991	4768.29

For TATAMOTORS.BO

Historical volatility for last 1 month = 0.24584680647471627

Strike price (K)	Call Option	Put Option
0.5*S0	400.014	0.00037452
0.6*S0	323.896	0.0294835
0.7*S0	248.272	0.553341
0.8*S0	175.698	4.12612
0.9*S0	112.07	16.6462
1.0*S0	63.5993	44.3225
1.1*S0	32.1219	88.9925
1.2*S0	14.5786	147.597
1.3*S0	6.02864	215.194
1.4*S0	2.30505	287.618
1.5*S0	0.82617	362.286

For INFY.BO

Historical volatility for last 1 month = 0.280072856404496

Strike price (K)	Call Option	Put Option
0.5*S0	790.479	0.00746481
0.6*S0	640.238	0.242258
0.7*S0	492.11	2.58943
0.8*S0	352.567	13.5228
0.9*S0	232.322	43.7533
1.0*S0	140.195	102.102
1.1*S0	77.775	190.158
1.2*S0	40.0139	302.872
1.3*S0	19.2954	432.629
1.4*S0	8.81433	572.624
1.5*S0	3.85165	718.137

## NSE:

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

For ACC.NS

Historical volatility for last 1 month = 0.4530145381485838

Strike price (K)	Call Option	Put Option
0.5*S0	1135.04	2.12194
0.6*S0	927.744	10.486
0.7*S0	734.717	33.1244
0.8*S0	563.97	78.0436
0.9*S0	420.672	150.411
1.0*S0	306.042	251.446
1.1*S0	218.026	379.095
1.2*S0	152.684	529.419
1.3*S0	105.473	697.873
1.4*S0	72.0846	880.15
1.5*S0	48.8653	1072.6

For HINDZINC.NS

Historical volatility for last 1 month = 0.2636047745990205

Strike price (K)	Call Option	Put Option
0.5*S0	162.952	0.000560241
0.6*S0	131.958	0.0266992
0.7*S0	101.276	0.364463
0.8*S0	72.1154	2.22322
0.9*S0	46.7973	7.92488
1.0*S0	27.4601	19.6075
1.1*S0	14.6082	37.7753
1.2*S0	7.11068	61.2975
1.3*S0	3.20533	88.4118
1.4*S0	1.35472	117.581
1.5*S0	0.54301	147.789

For IDEA.NS

Historical volatility for last 1 month = 0.8347864627348135

Strike price (K)	Call Option	Put Option
0.5*S0	8.54473	0.347209
0.6*S0	7.33352	0.69649
0.7*S0	6.26702	1.19049
0.8*S0	5.34161	1.82558
0.9*S0	4.54675	2.59122
1.0*S0	3.8687	3.47365
1.1*S0	3.29284	4.45829
1.2*S0	2.80508	5.53103
1.3*S0	2.3925	6.67895
1.4*S0	2.04368	7.89062
1.5*S0	1.74867	9.15611

For IGL.NS

Historical volatility for last 1 month = 0.18798542455845071

Strike price (K)	Call Option	Put Option
0.5*S0	214.34	2.21632e-07
0.6*S0	173.538	0.000264269
0.7*S0	132.763	0.0274096
0.8*S0	92.5239	0.590663
0.9*S0	55.6276	4.49639
1.0*S0	27.445	17.1159
1.1*S0	10.8746	41.3476
1.2*S0	3.4856	74.7607
1.3*S0	0.925041	113.002
1.4*S0	0.209108	153.088
1.5*S0	0.0413905	193.723

For GODREJIND.NS

Historical volatility for last 1 month = 0.24601812592470645

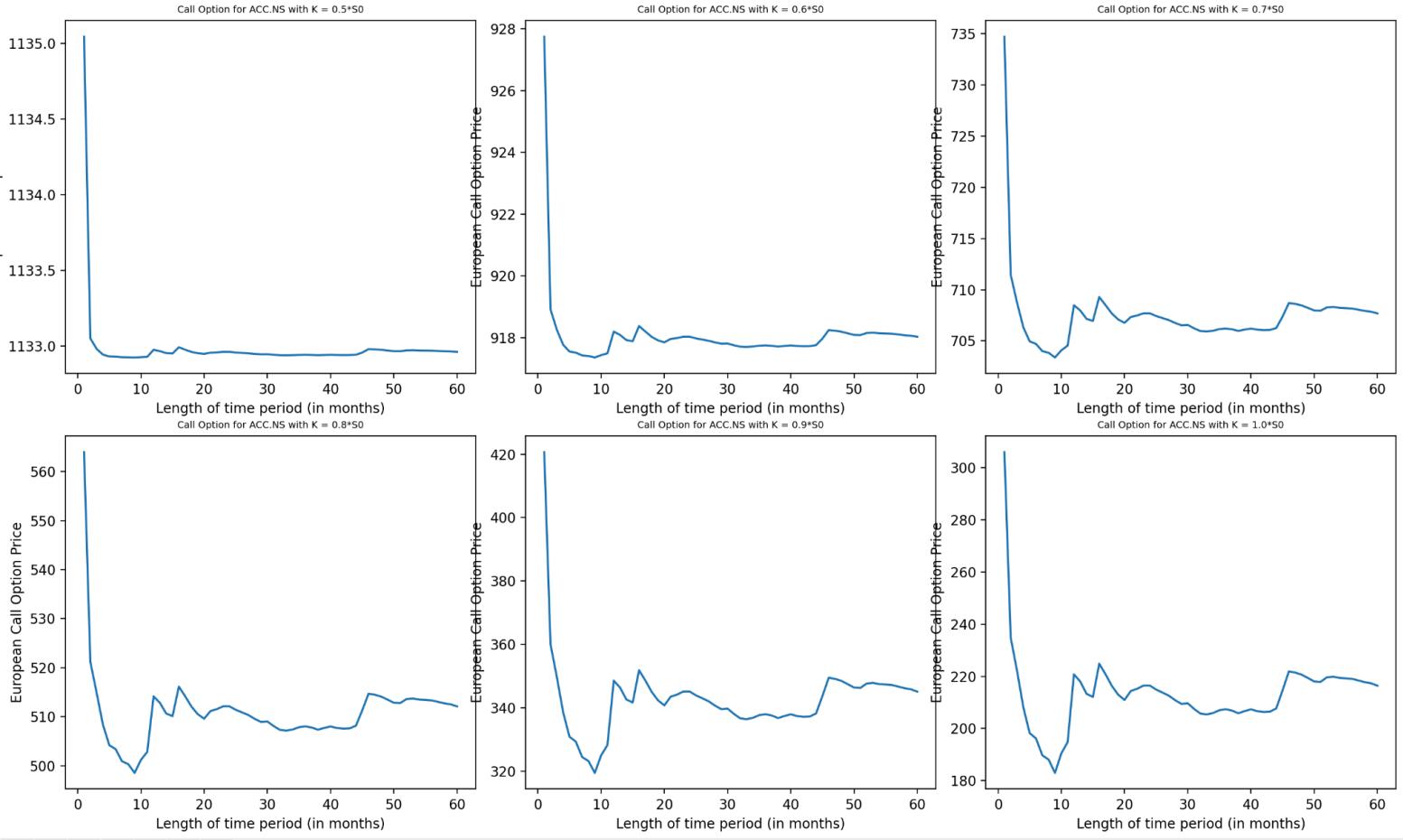
Strike price (K)	Call Option	Put Option
0.5*S0	381.416	0.000362065
0.6*S0	308.837	0.0283507
0.7*S0	236.732	0.530278
0.8*S0	167.54	3.94572
0.9*S0	106.885	15.8976
1.0*S0	60.6773	42.2968
1.1*S0	30.6627	84.8891
1.2*S0	13.9266	140.76
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1.4*S0	2.2063	274.254
1.5*S0	0.791718	345.446

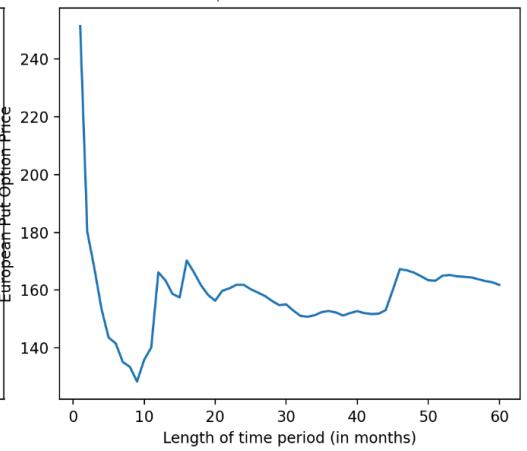
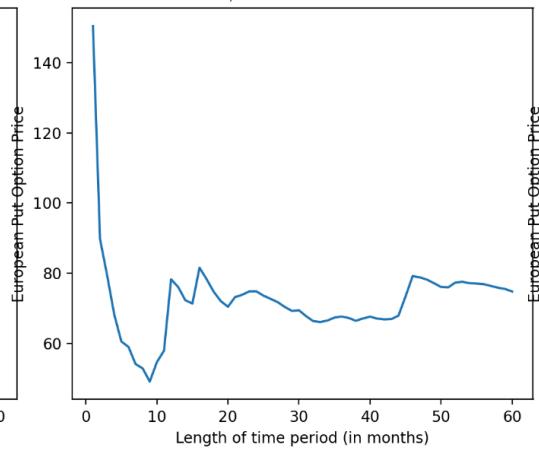
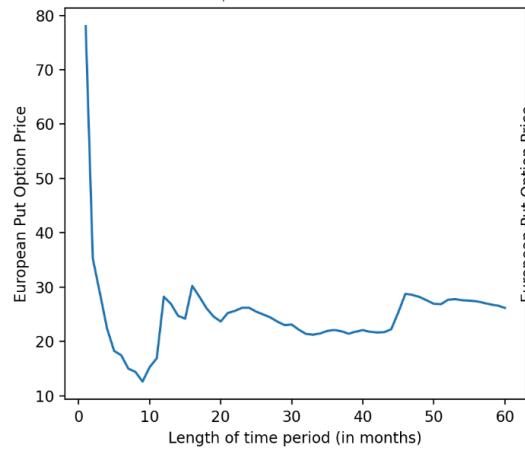
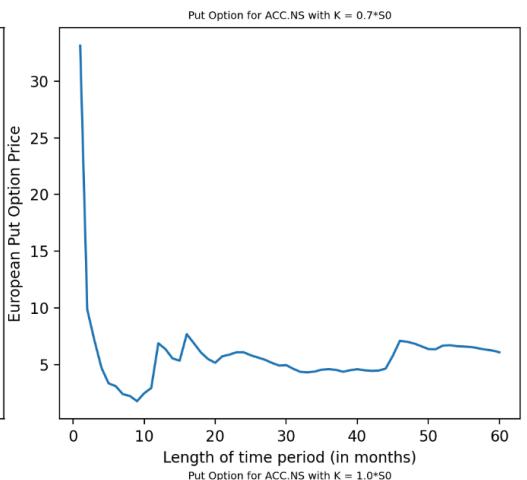
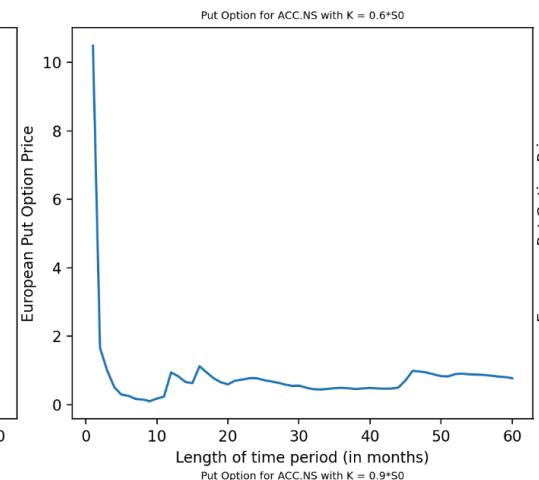
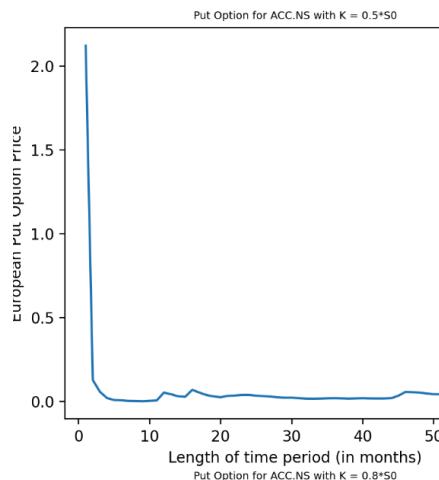
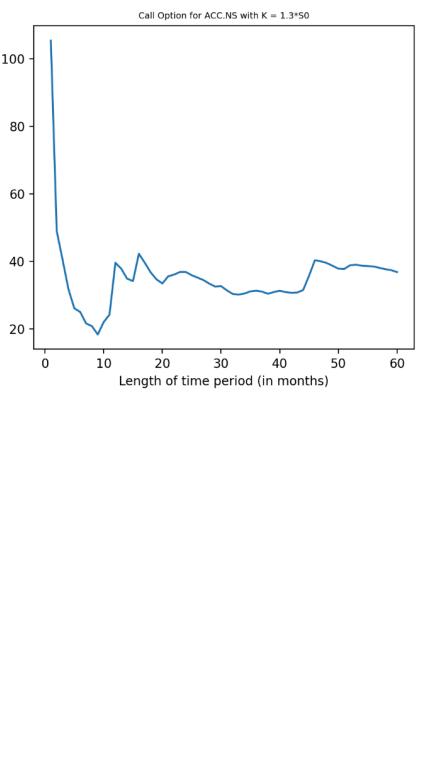
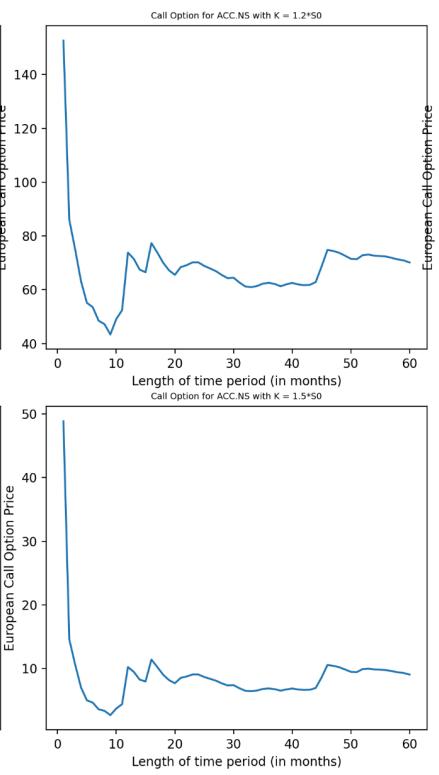
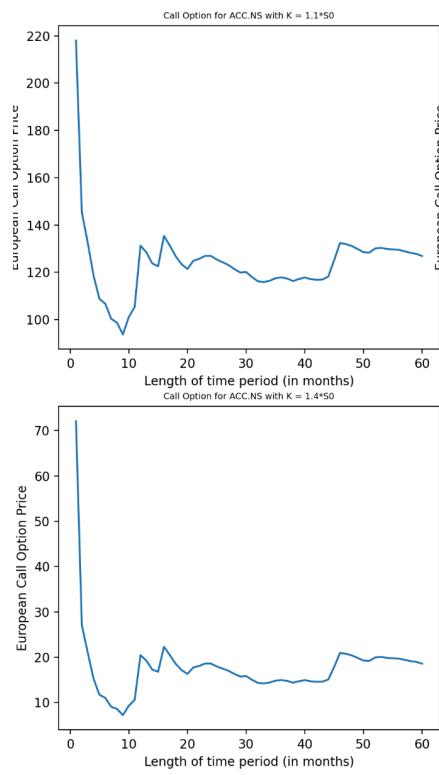
### Question 3

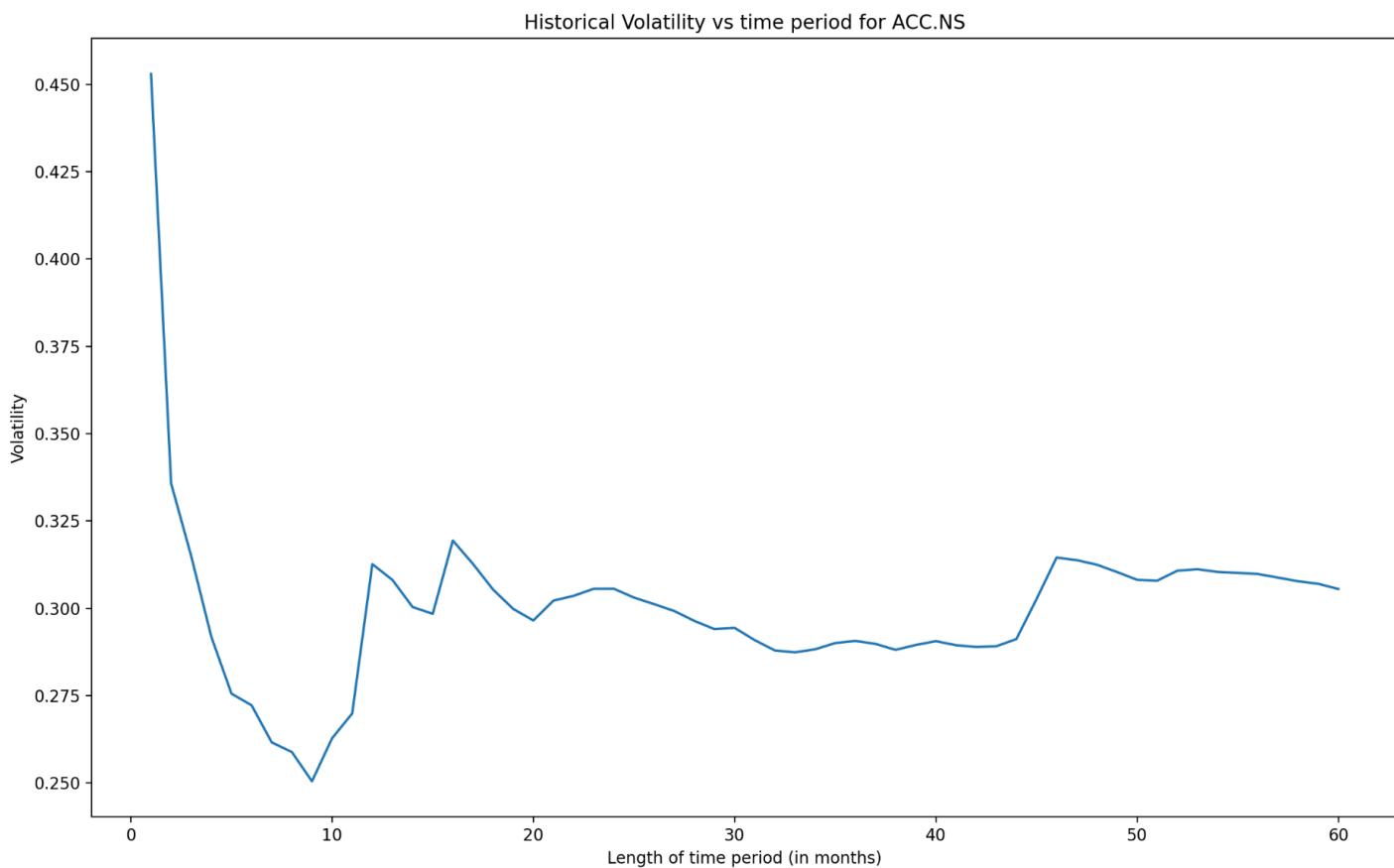
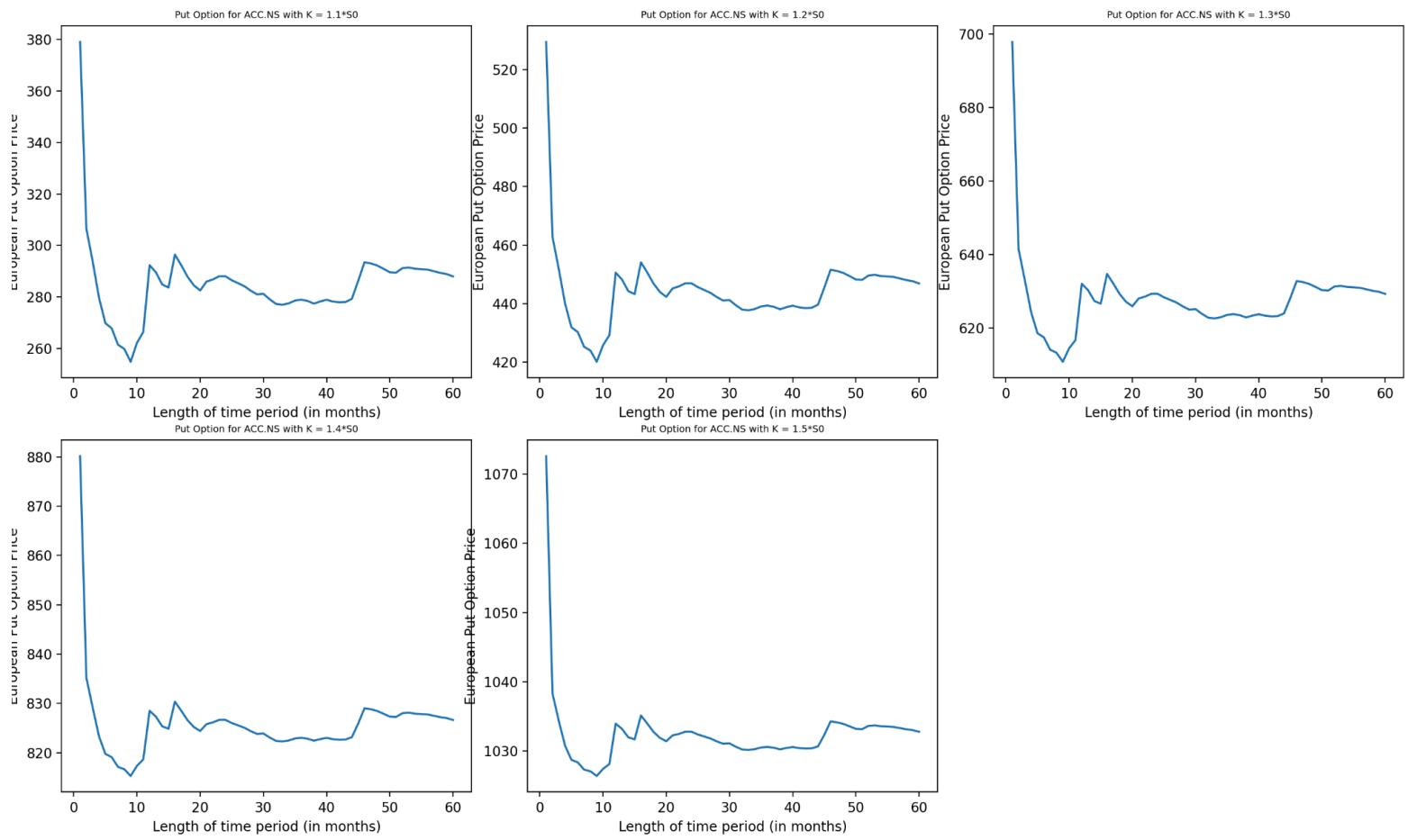
Again there are too many stocks in our data, I am attaching screenshots for the first 5 stocks of both bse/nse in this report. One may run the python code to see the output for the rest of the stocks.

Plots for Call Option, PUT Option and Volatility - stocks in nsedata1:

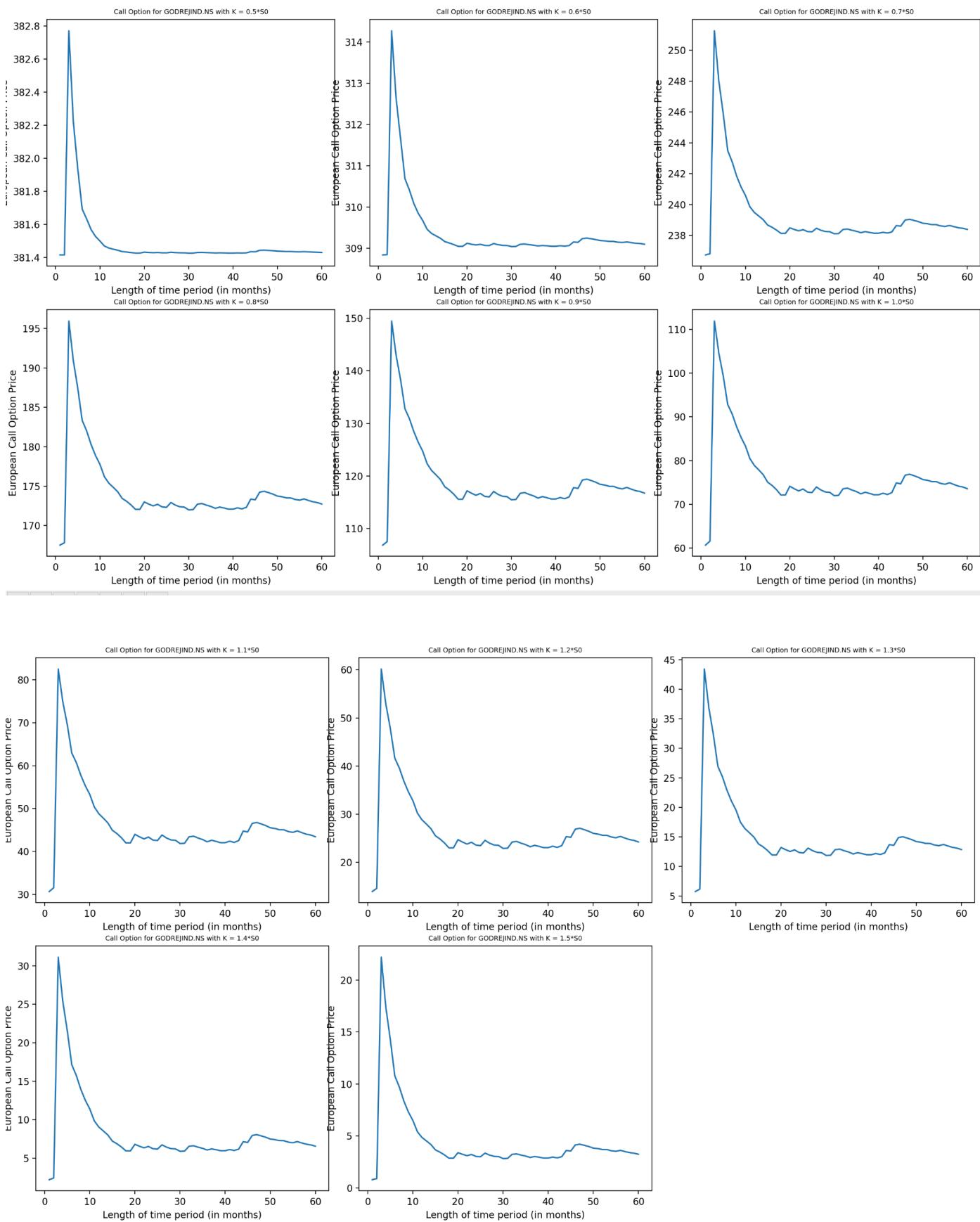
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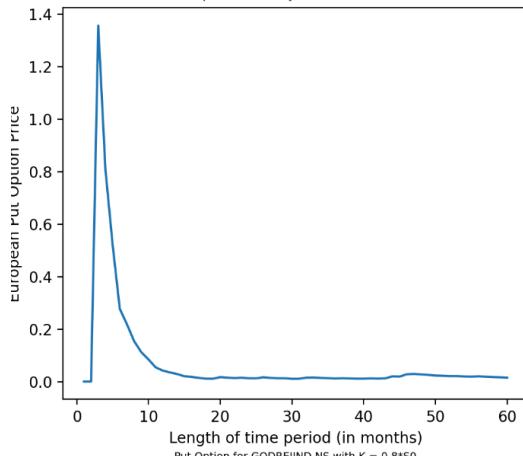
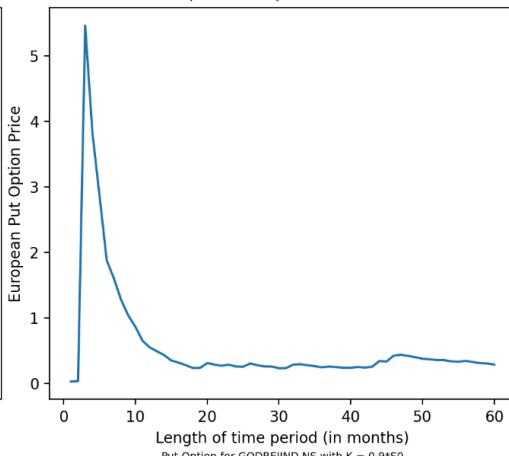
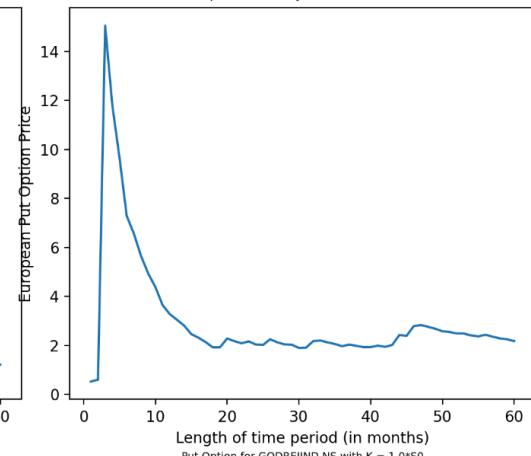
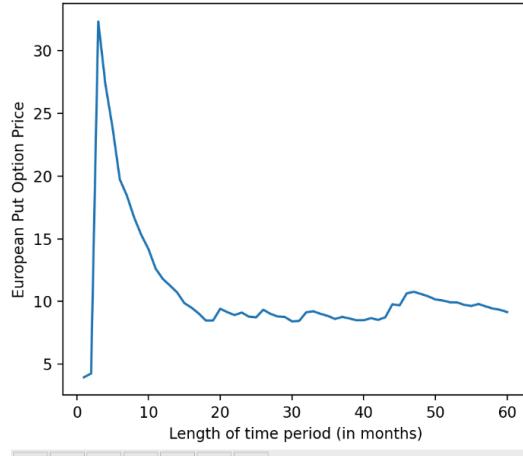
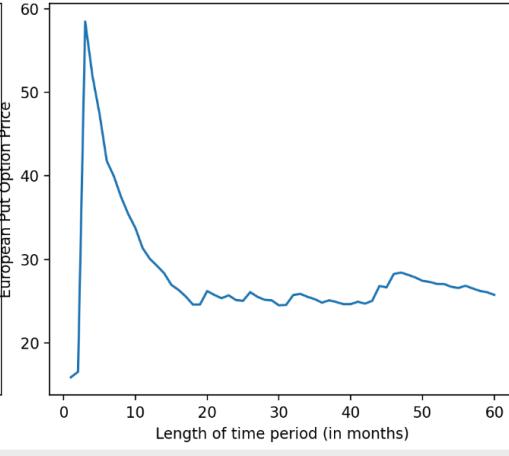
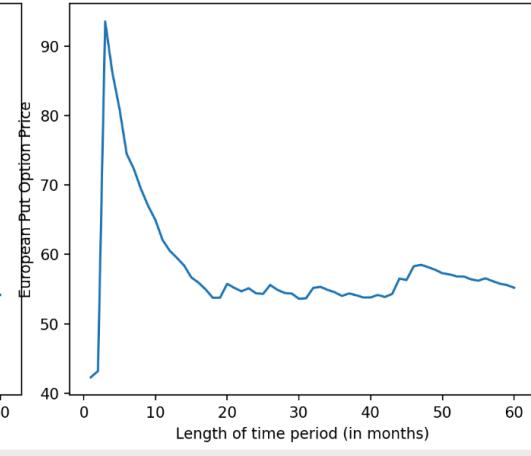
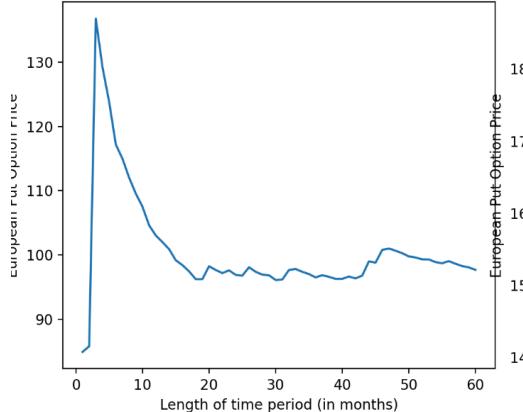
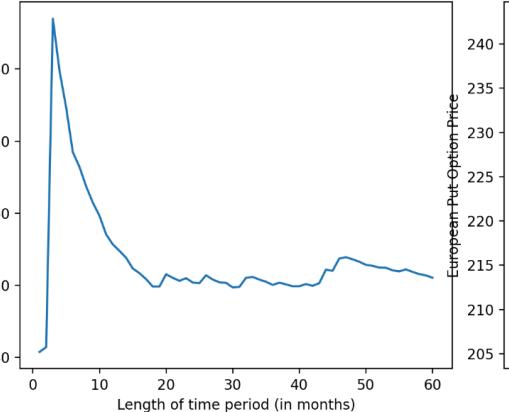
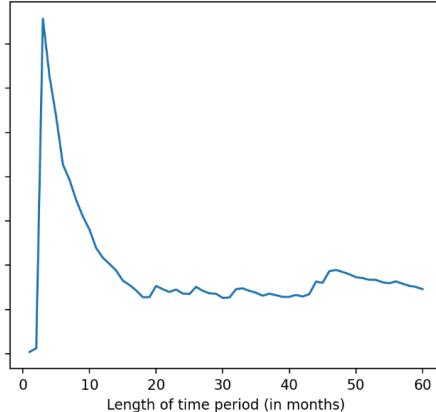
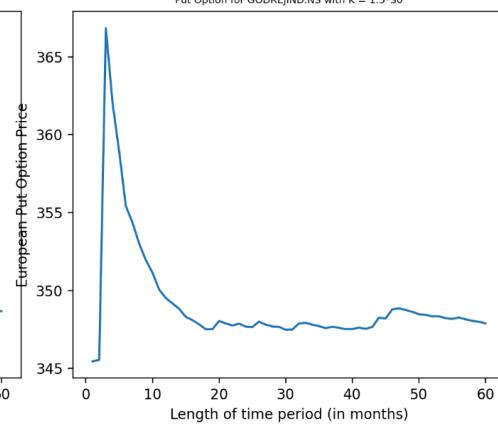
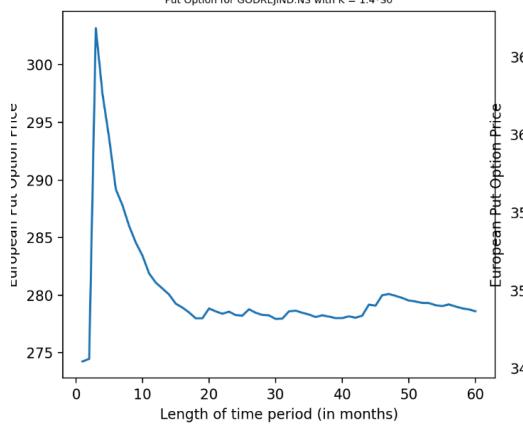




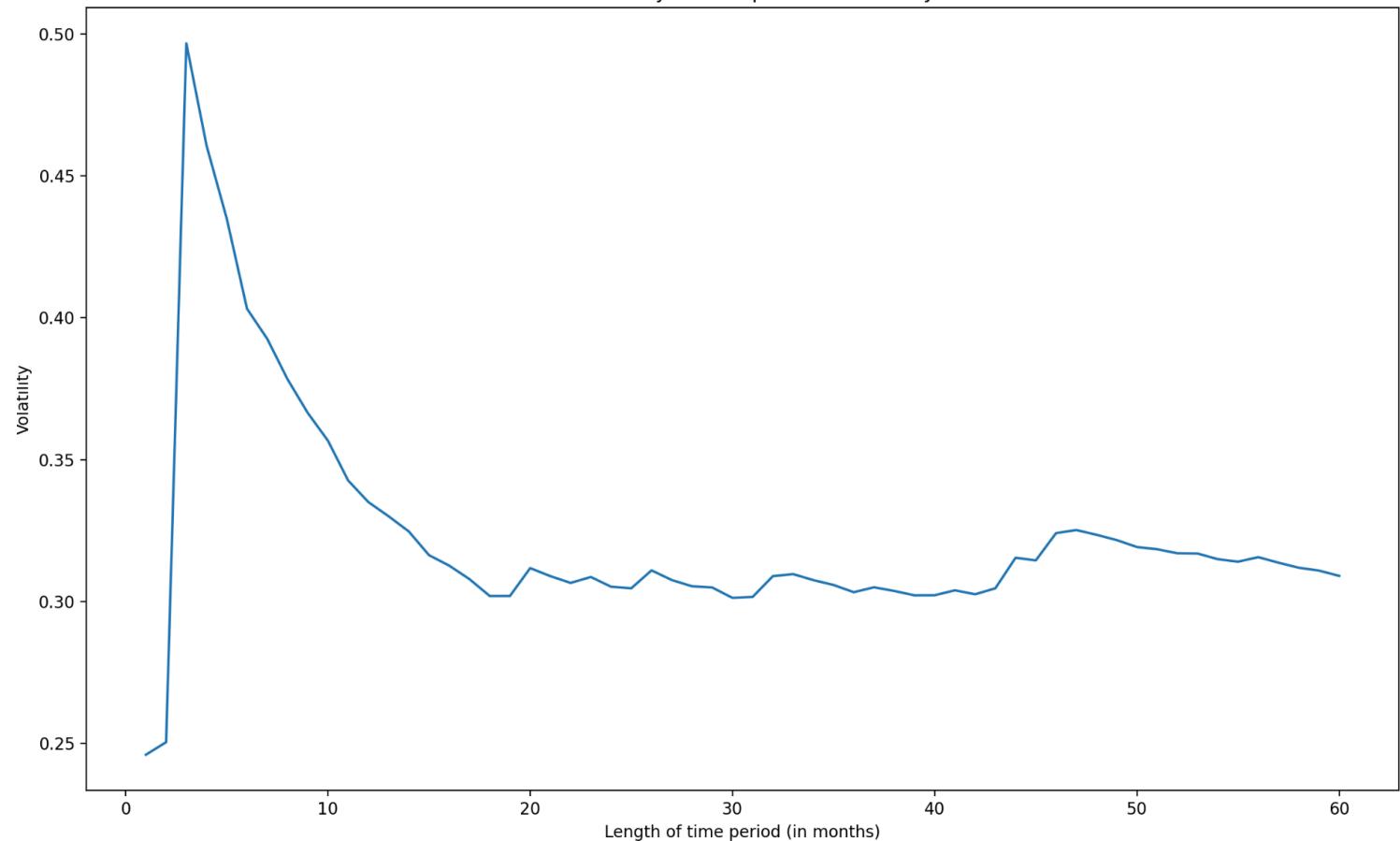


## 2) GODREJIND.NS

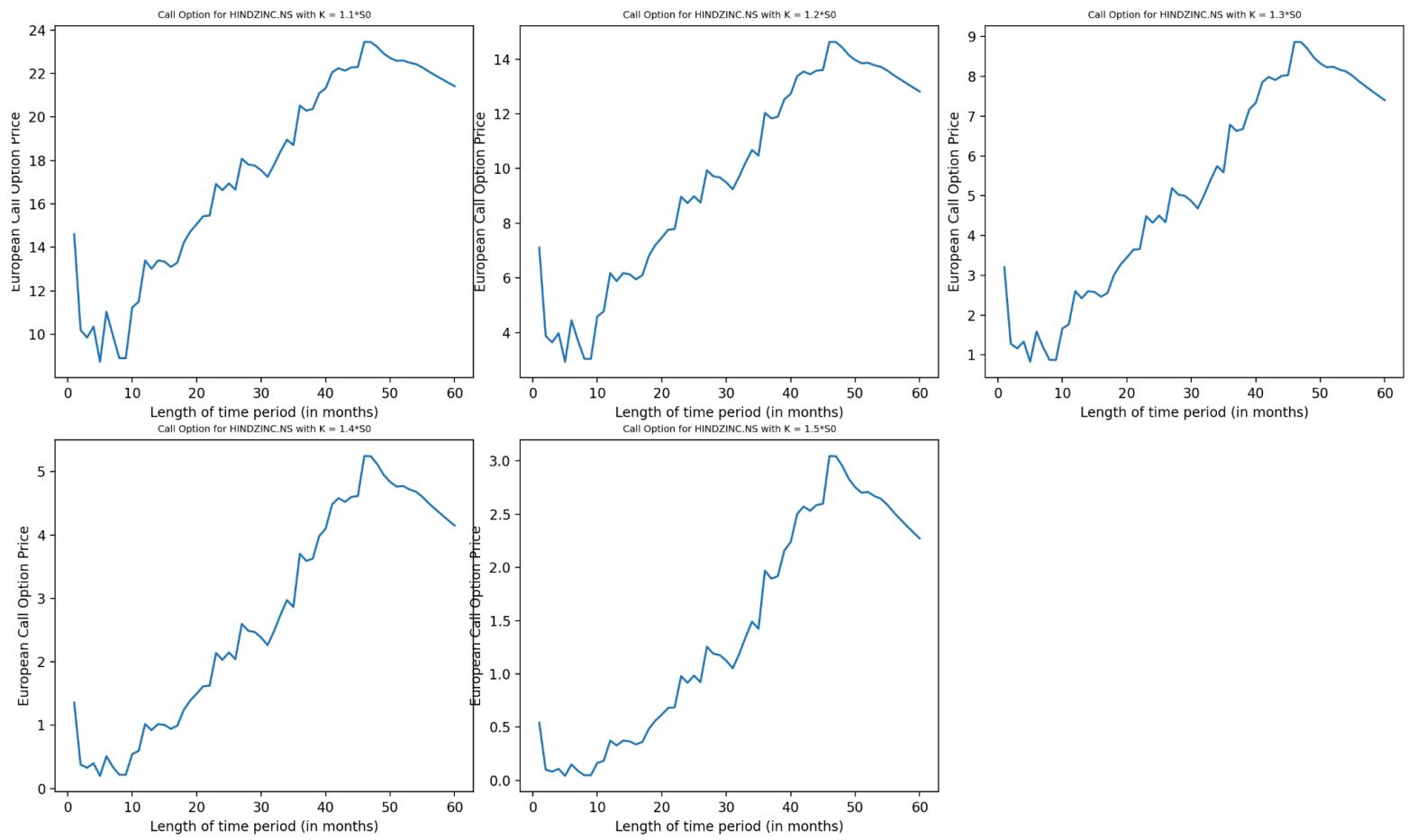
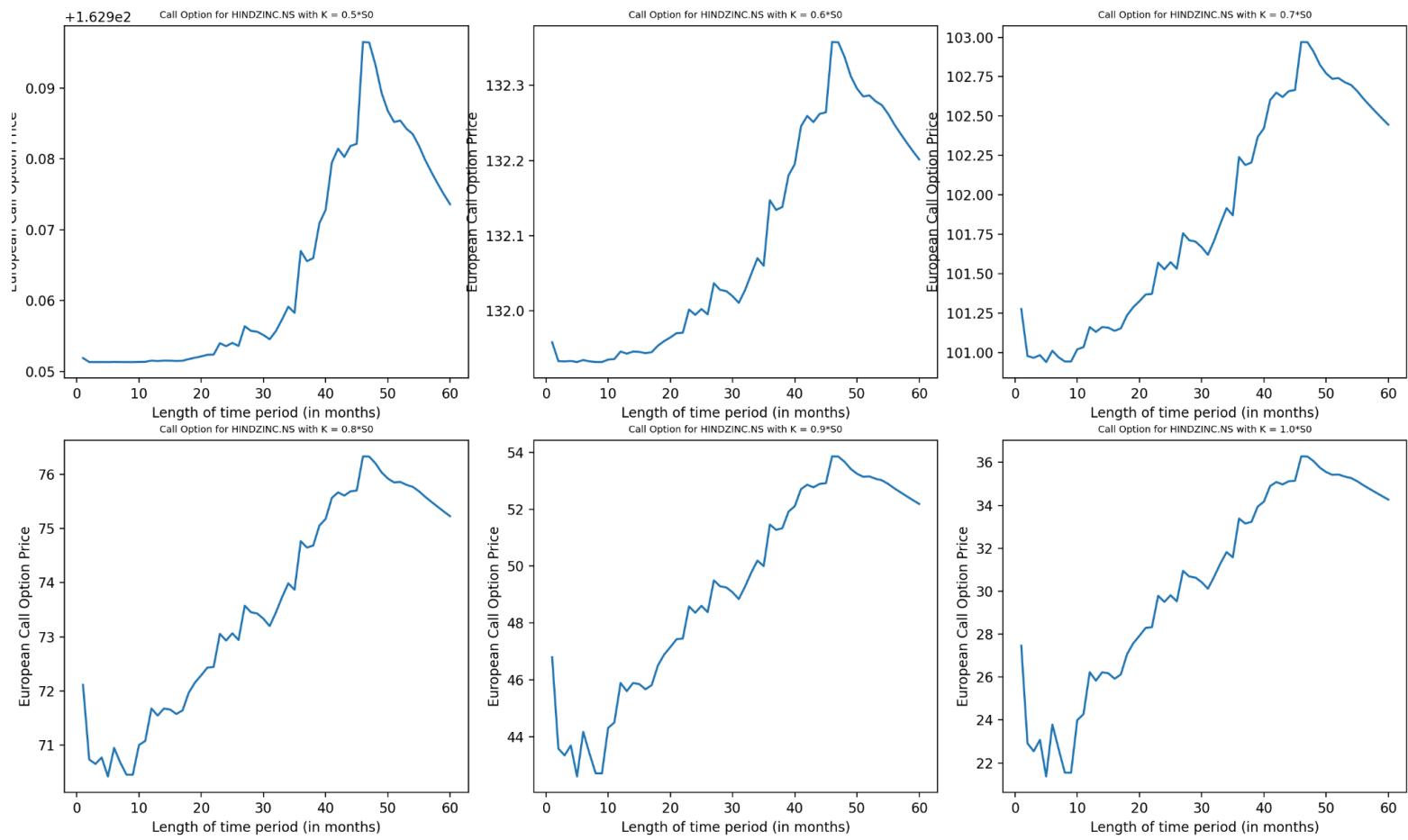


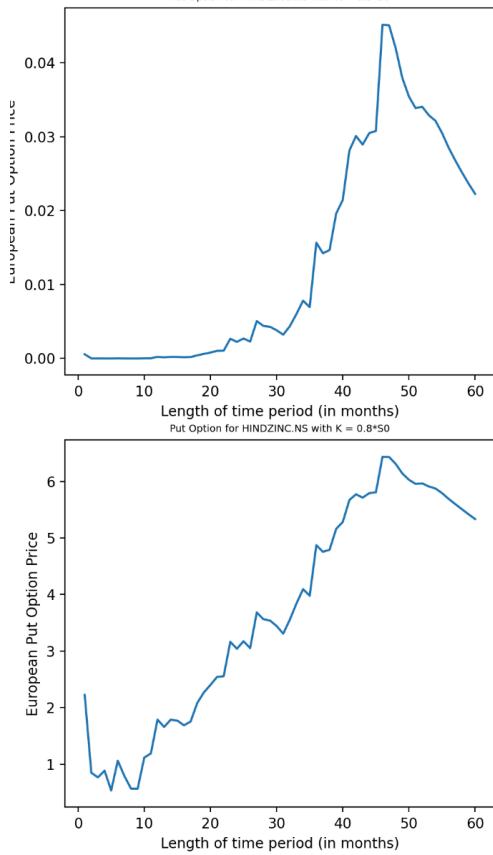
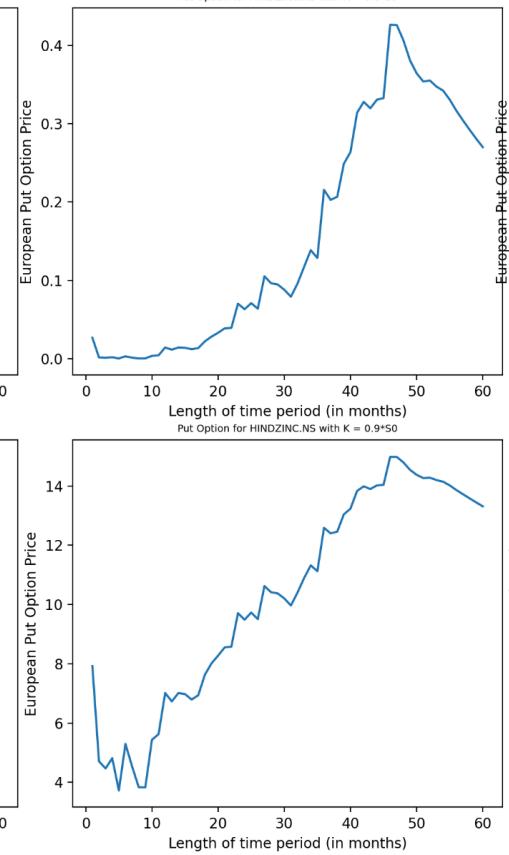
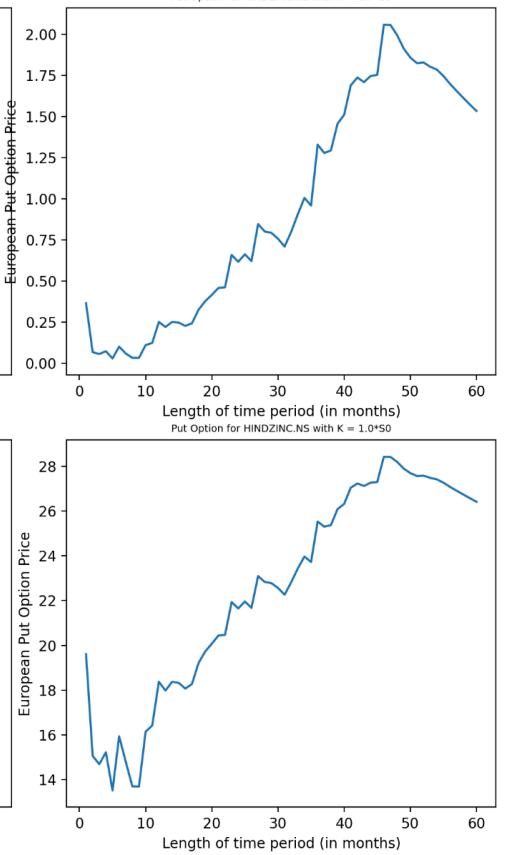
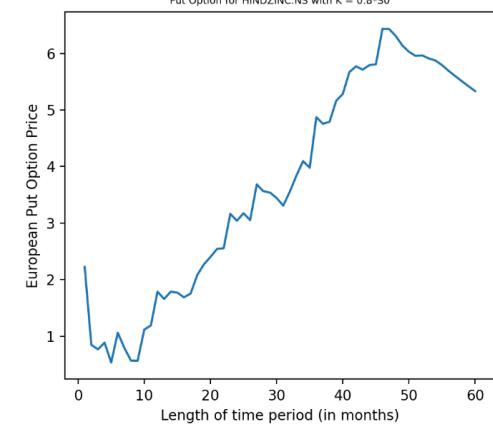
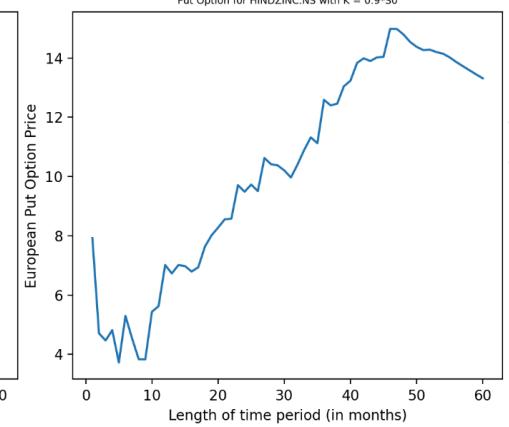
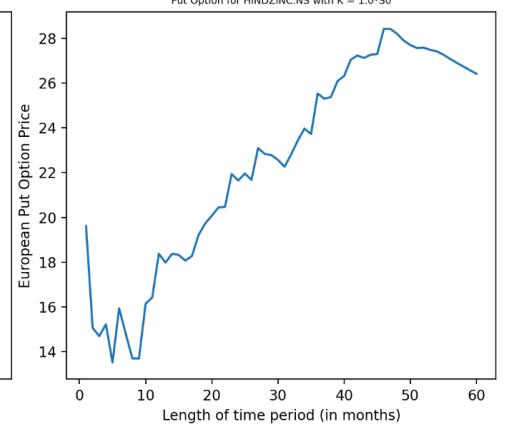
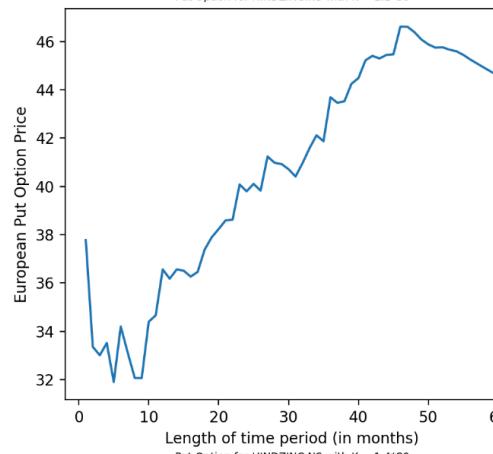
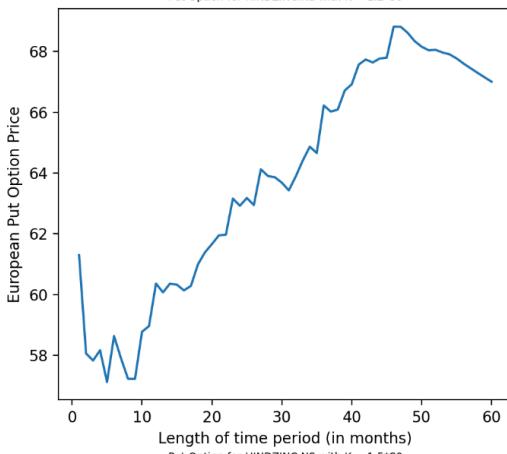
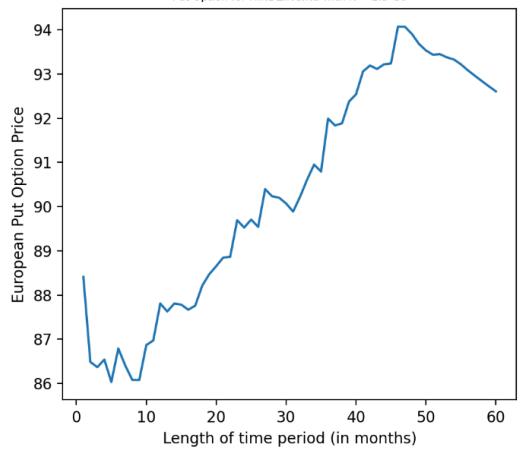
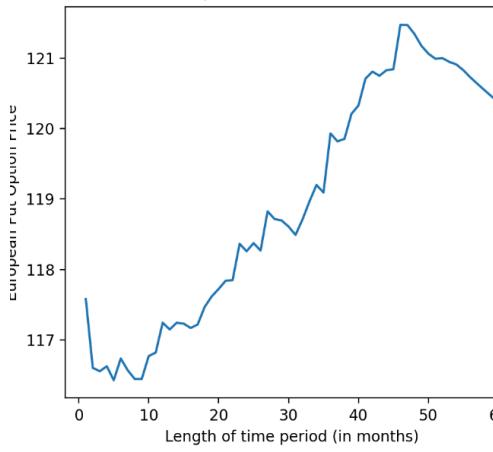
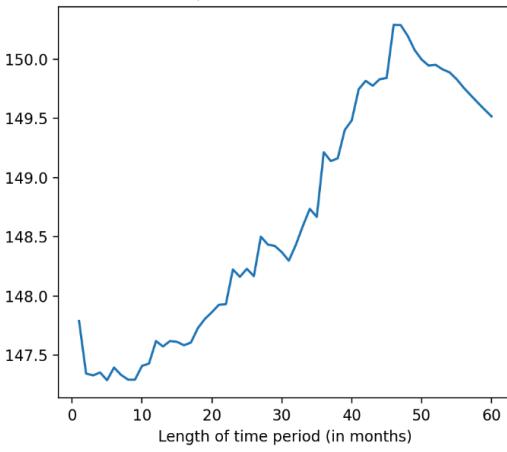
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Historical Volatility vs time period for GODREJIND.NS

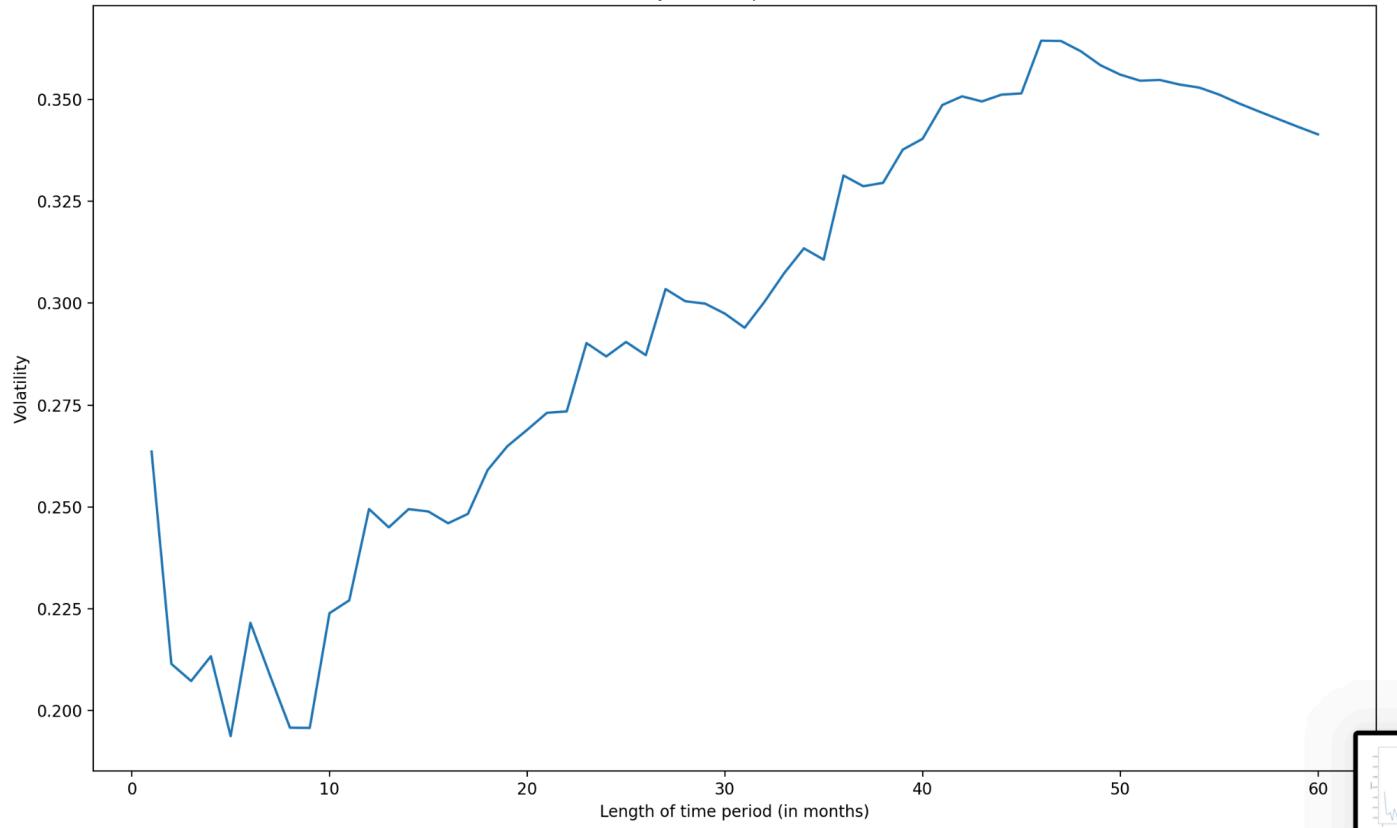


### 3) HINDZINC.NS

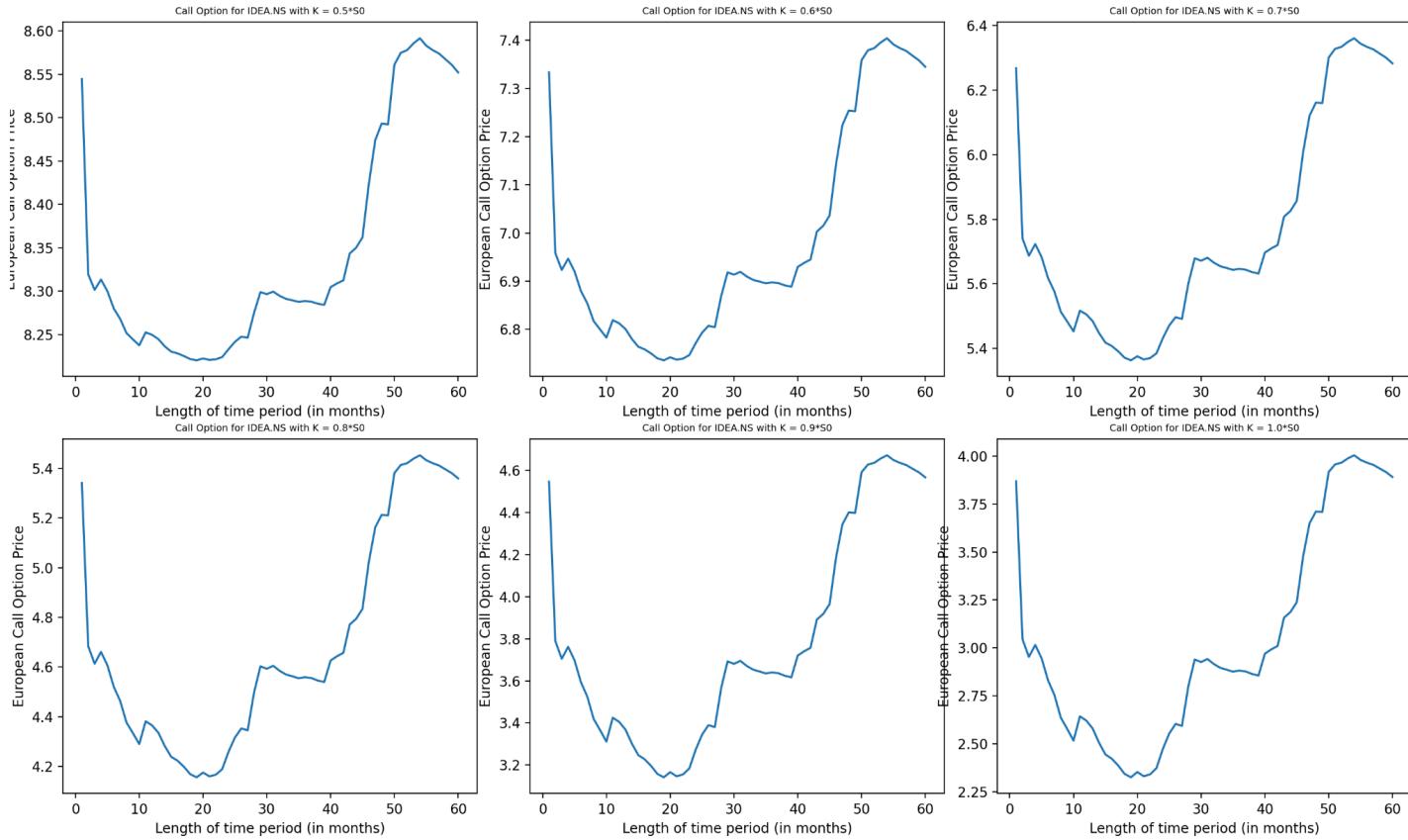


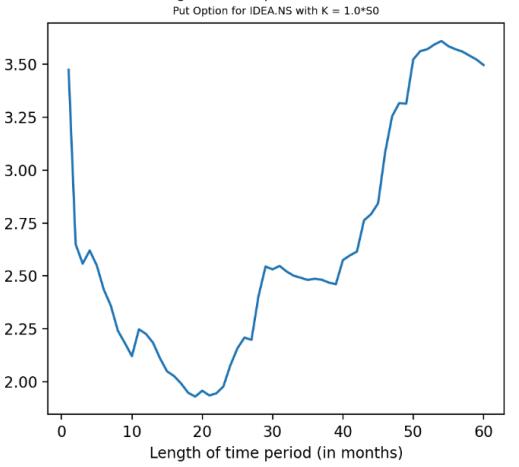
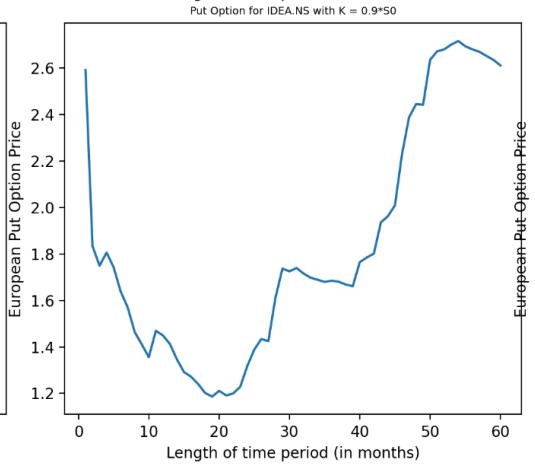
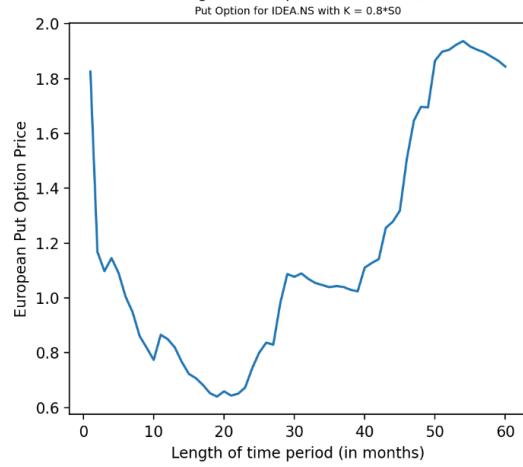
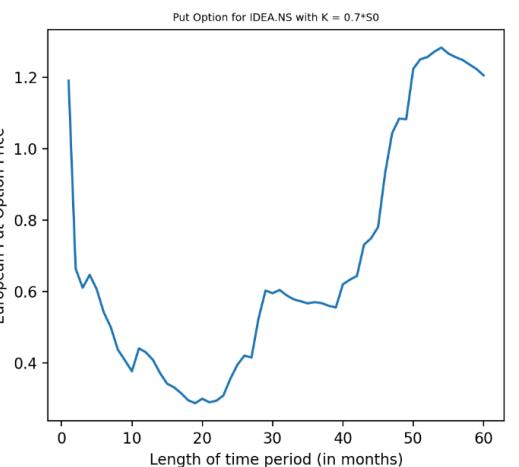
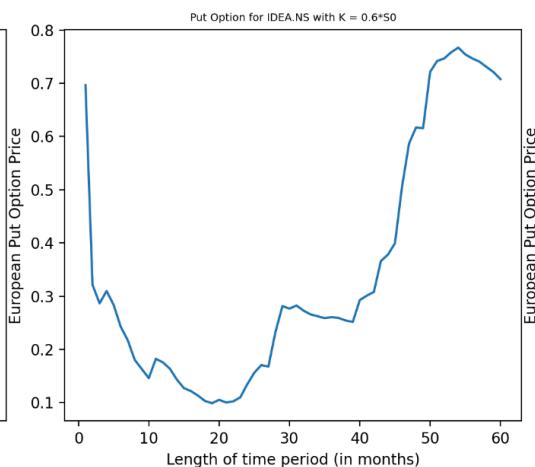
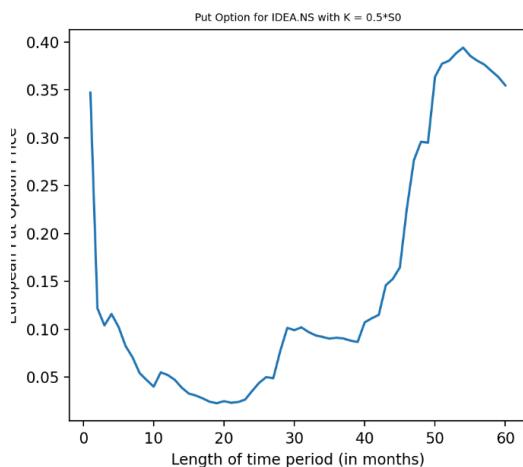
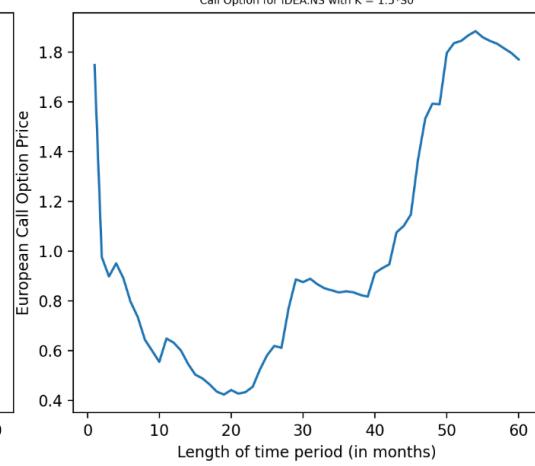
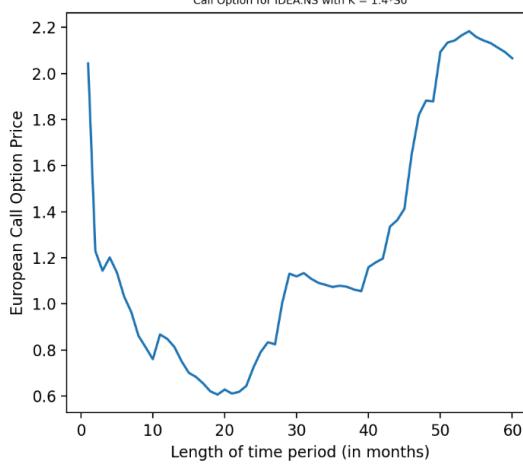
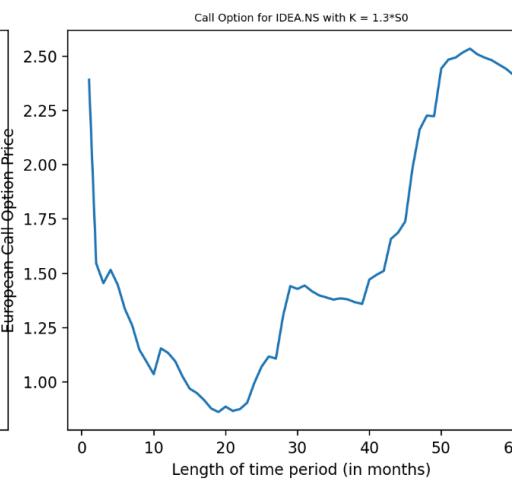
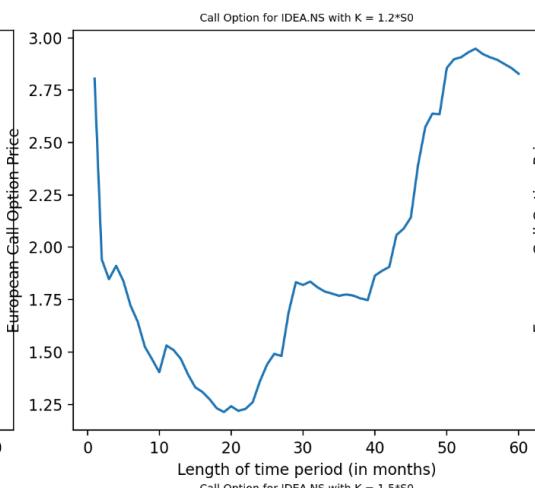
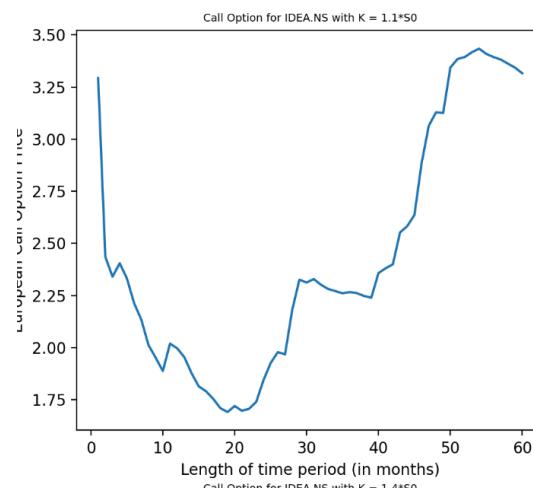
Put Option for HINDZINC.NS with  $K = 0.5*50$ Put Option for HINDZINC.NS with  $K = 0.6*50$ Put Option for HINDZINC.NS with  $K = 0.7*50$ Put Option for HINDZINC.NS with  $K = 0.8*50$ Put Option for HINDZINC.NS with  $K = 0.9*50$ Put Option for HINDZINC.NS with  $K = 1.0*50$ Put Option for HINDZINC.NS with  $K = 1.1*50$ Put Option for HINDZINC.NS with  $K = 1.2*50$ Put Option for HINDZINC.NS with  $K = 1.3*50$ Put Option for HINDZINC.NS with  $K = 1.4*50$ Put Option for HINDZINC.NS with  $K = 1.5*50$ 

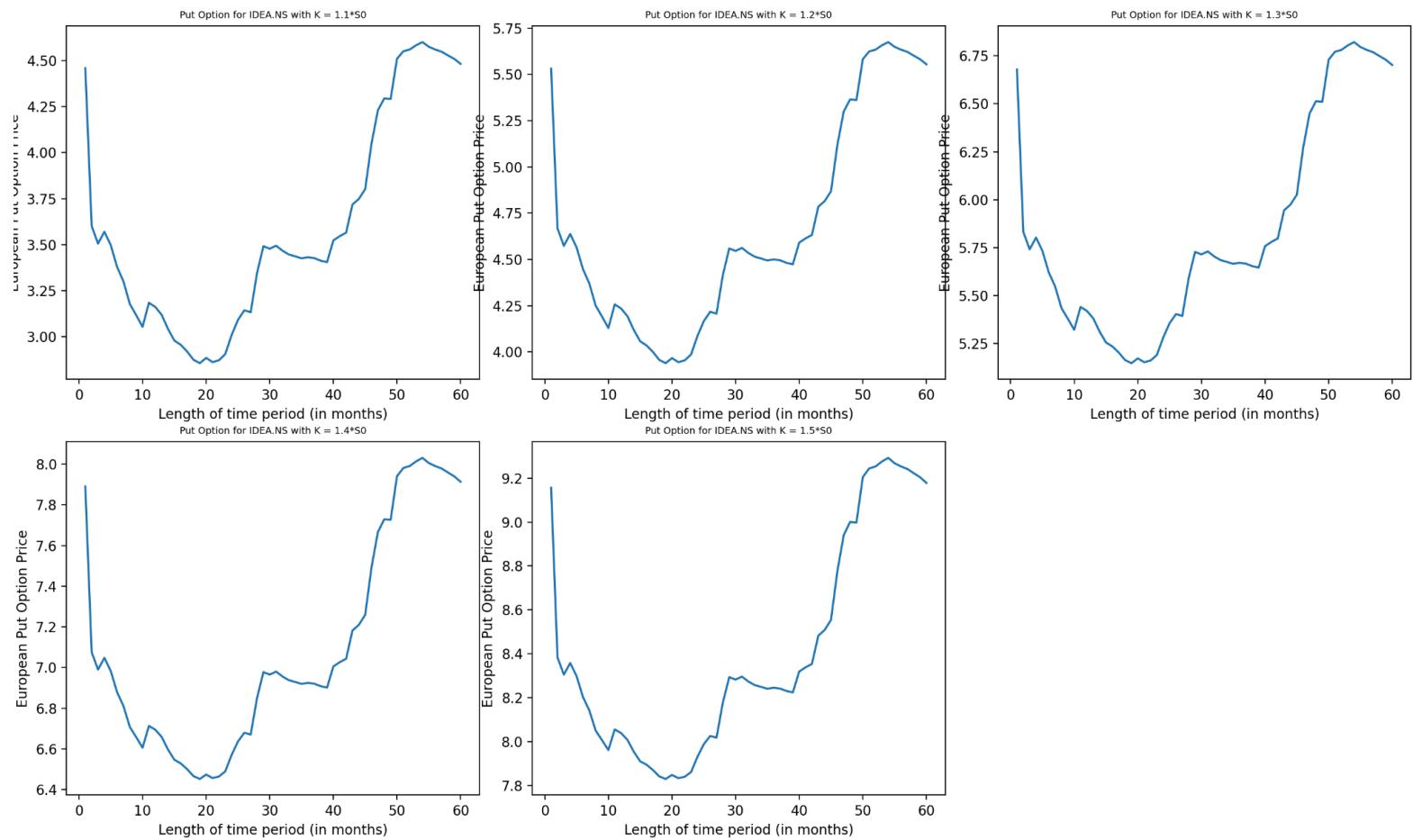
Historical Volatility vs time period for HINDZINC.NS



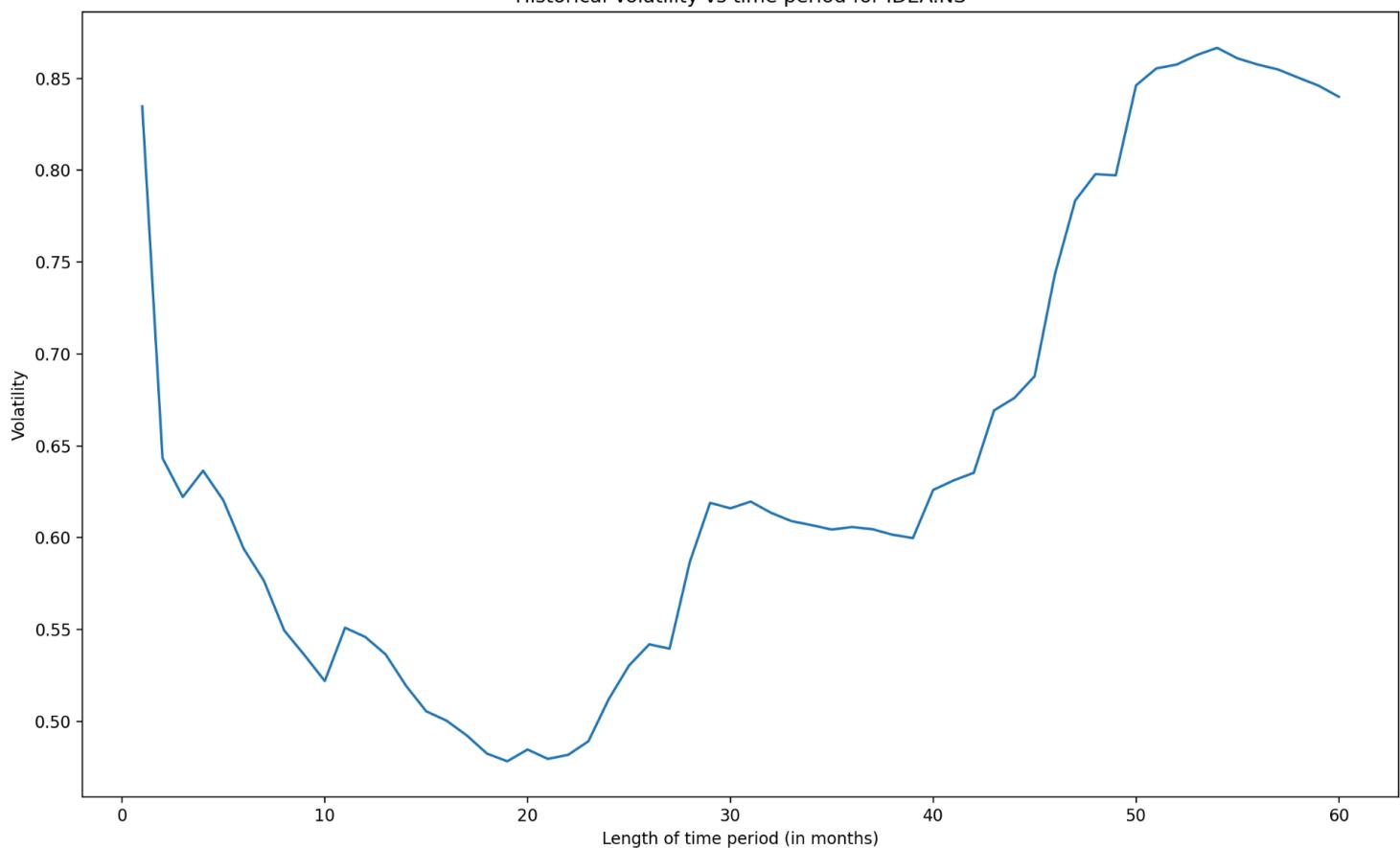
#### 4) IDEA.NS



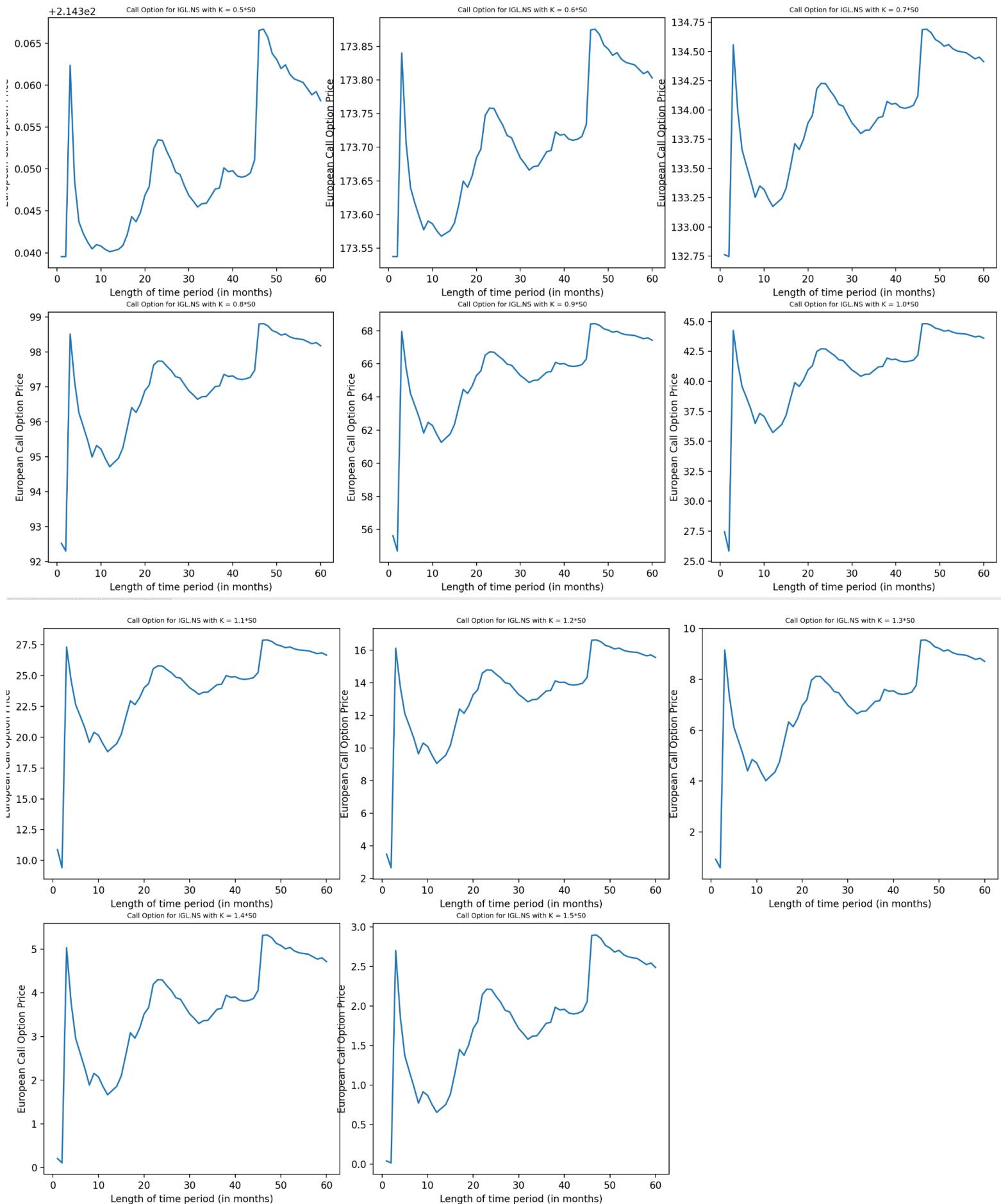


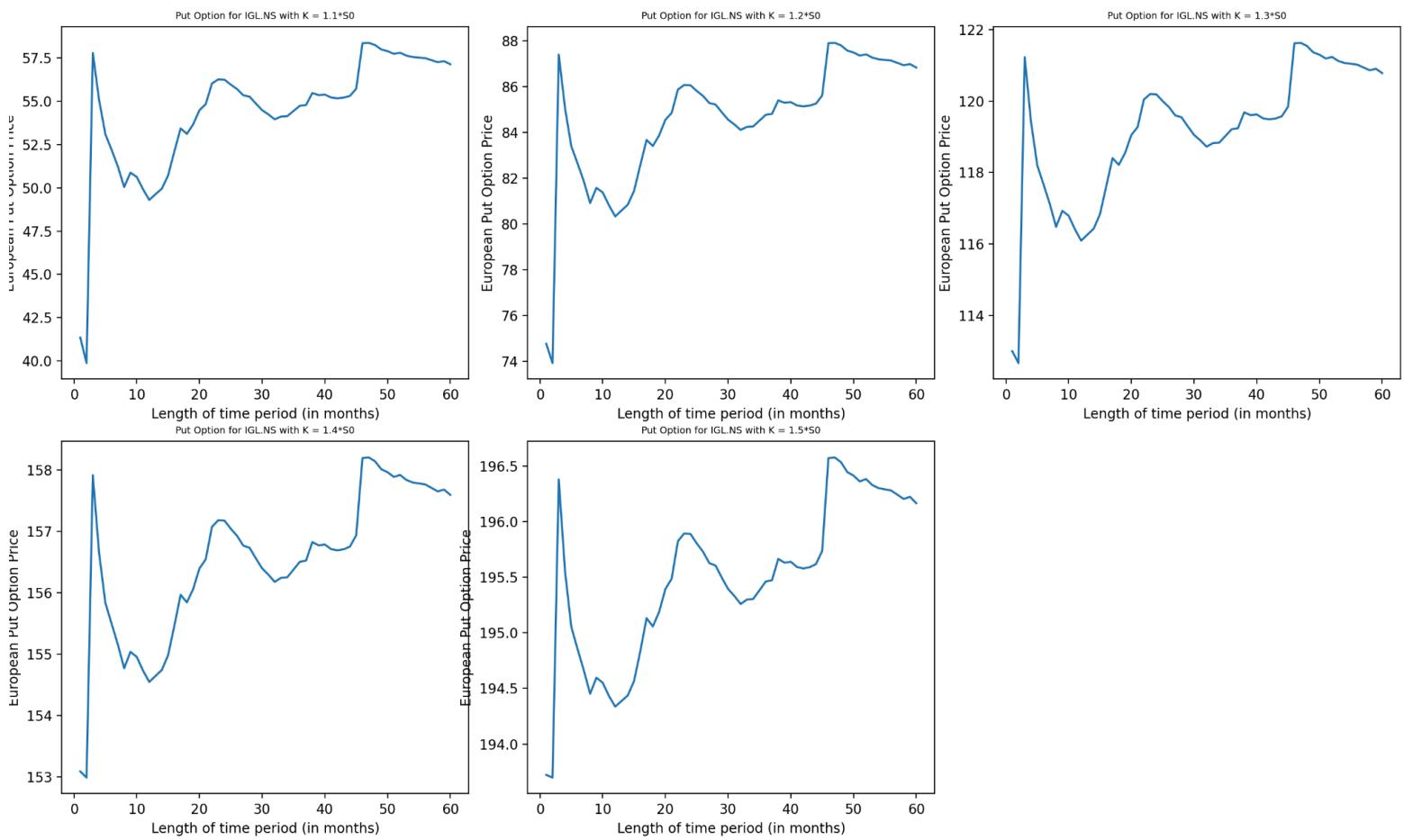
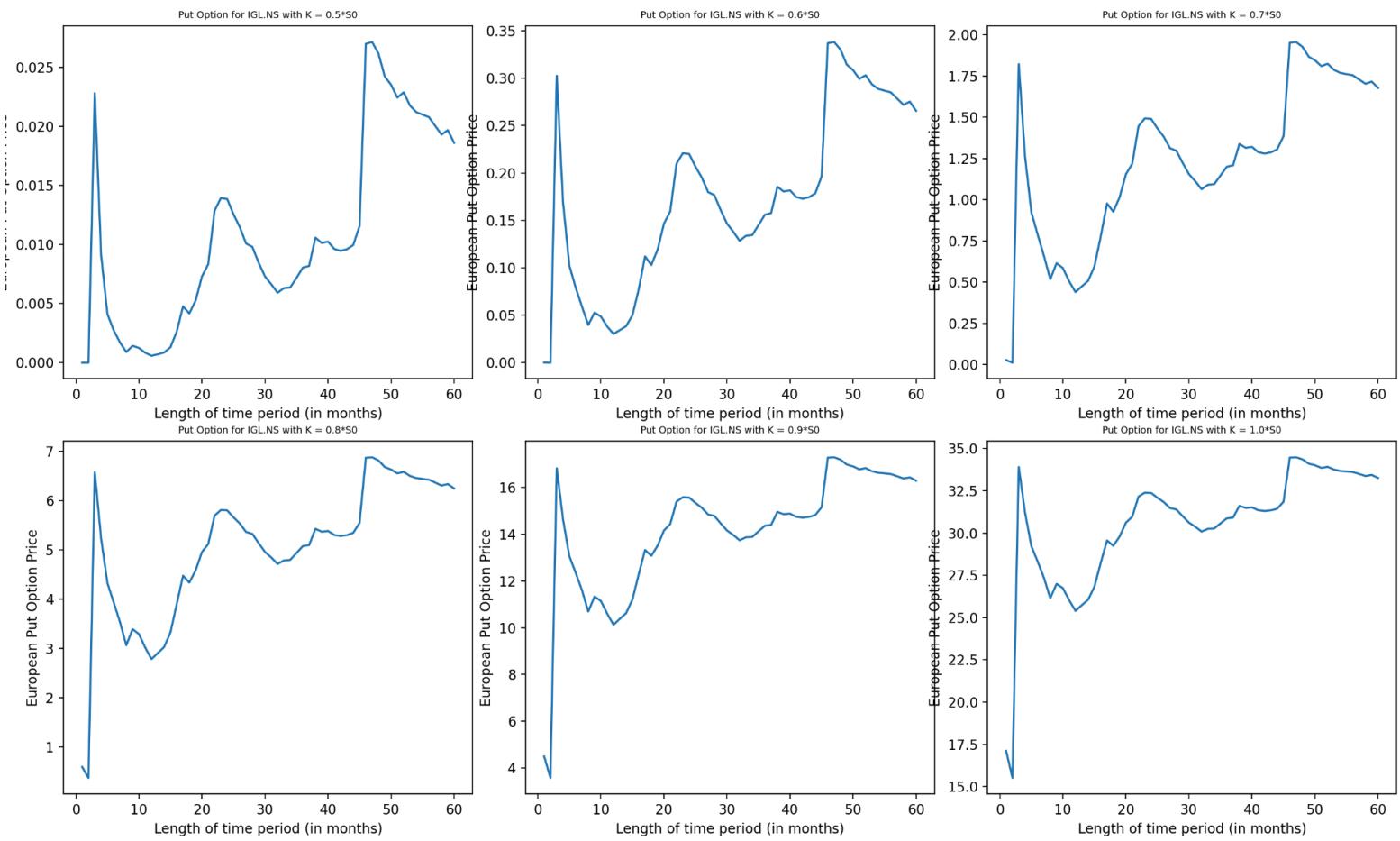


Historical Volatility vs time period for IDEA.NS

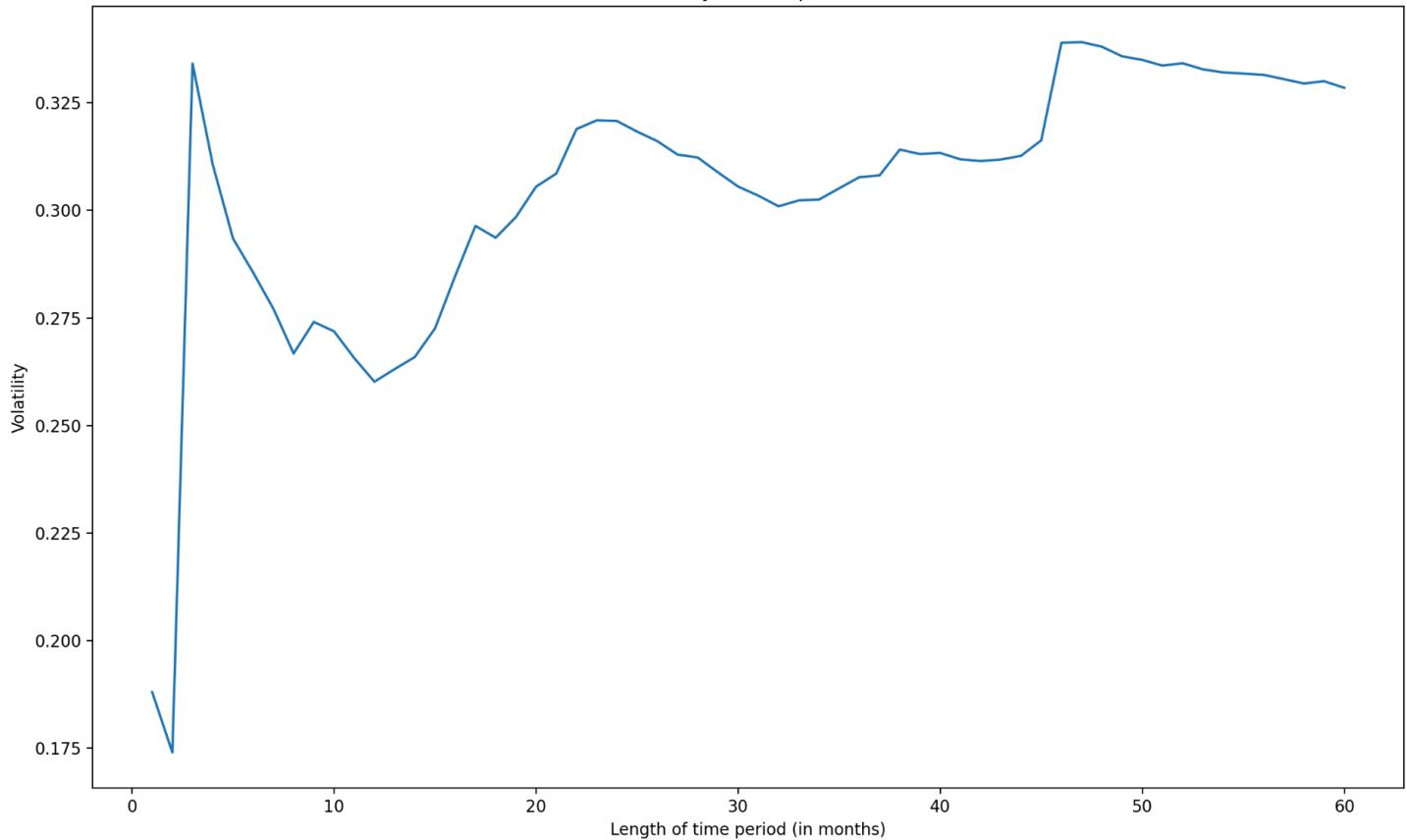


## 5) IGL.NS



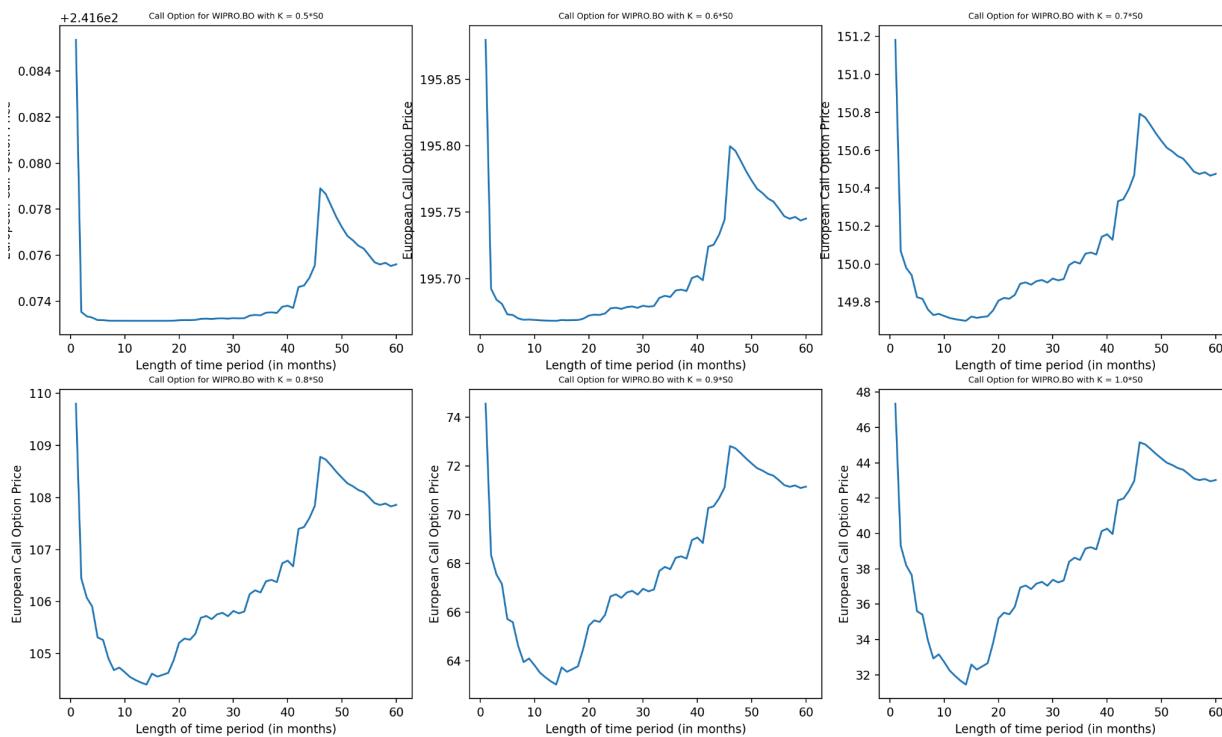


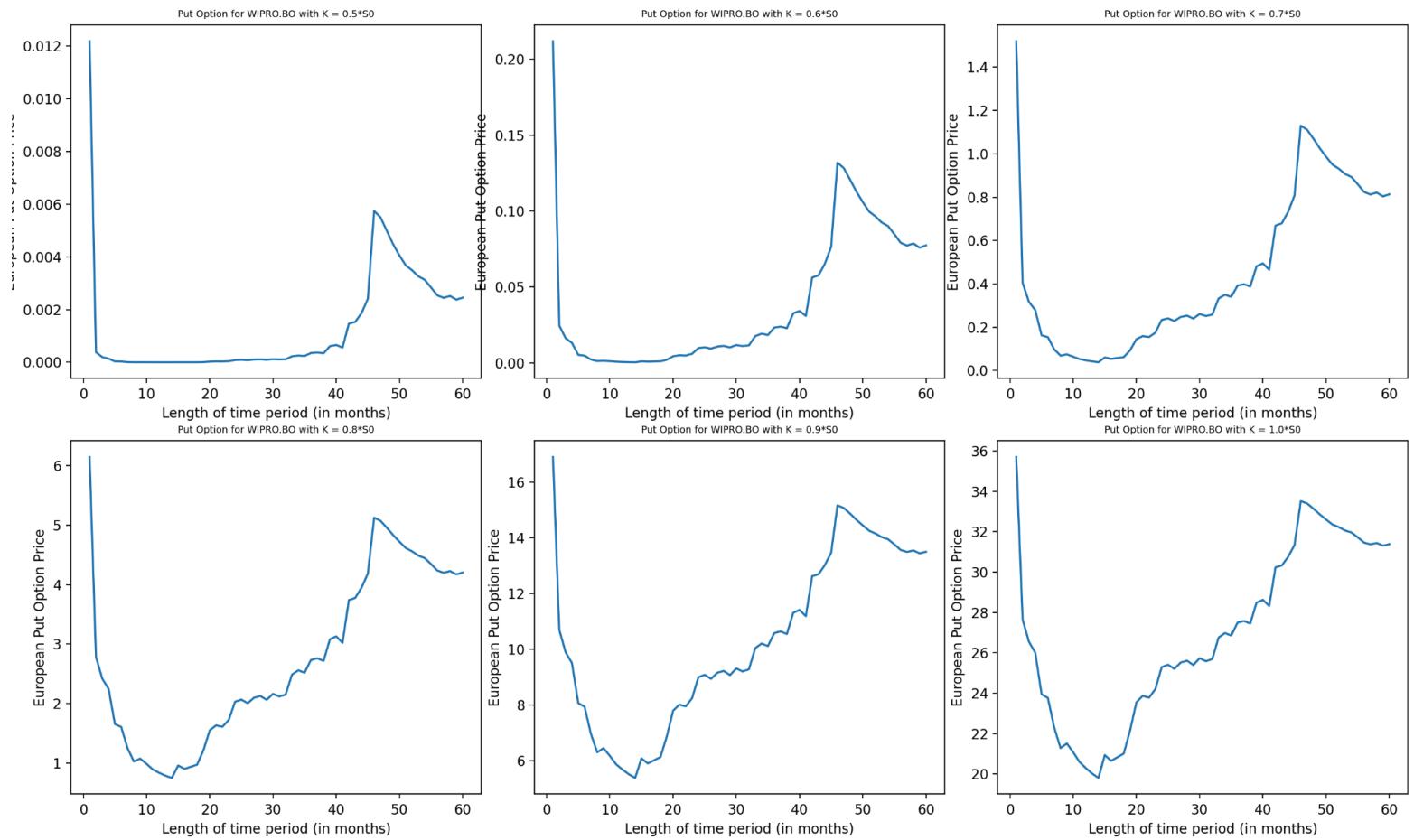
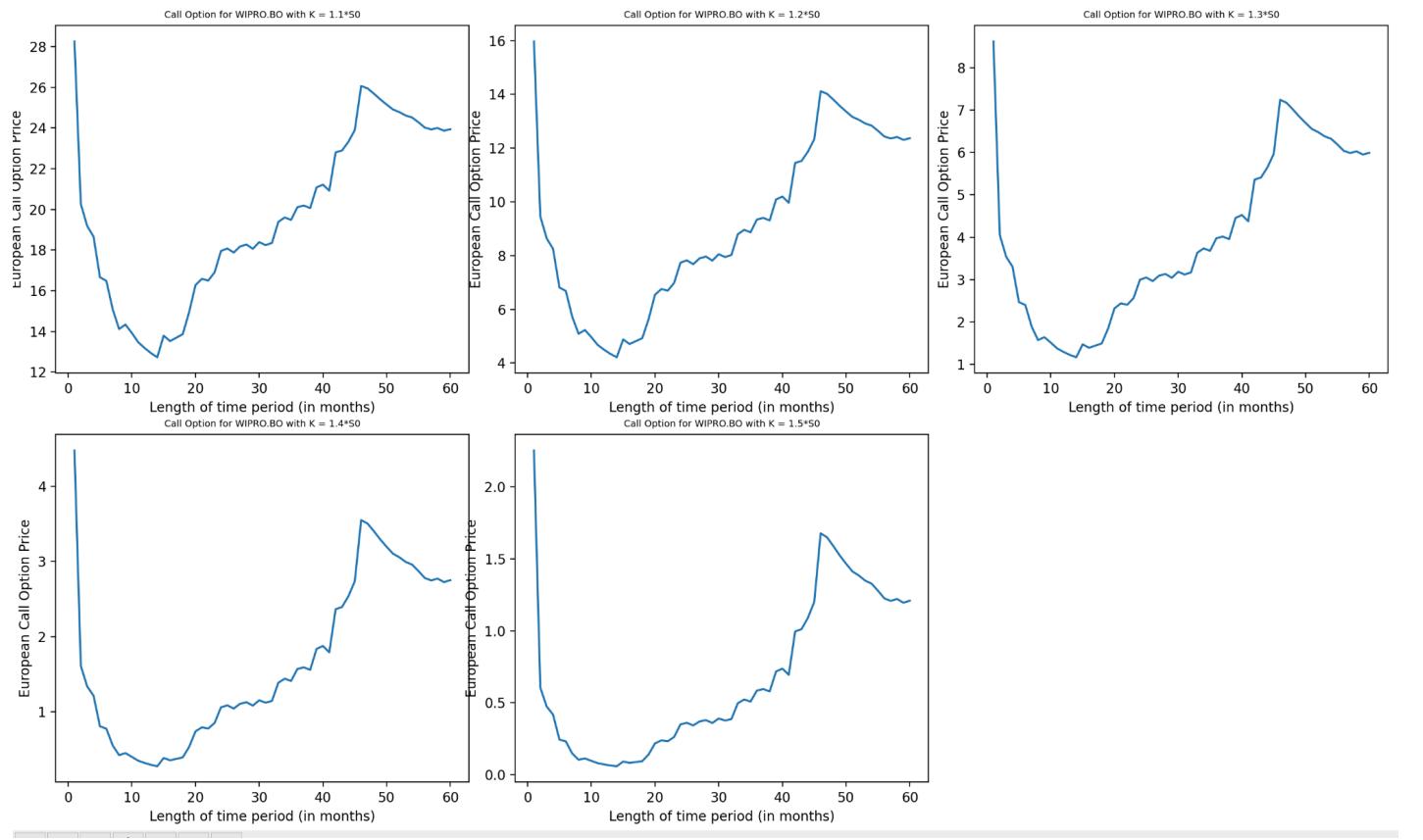
Historical Volatility vs time period for IGL.NS

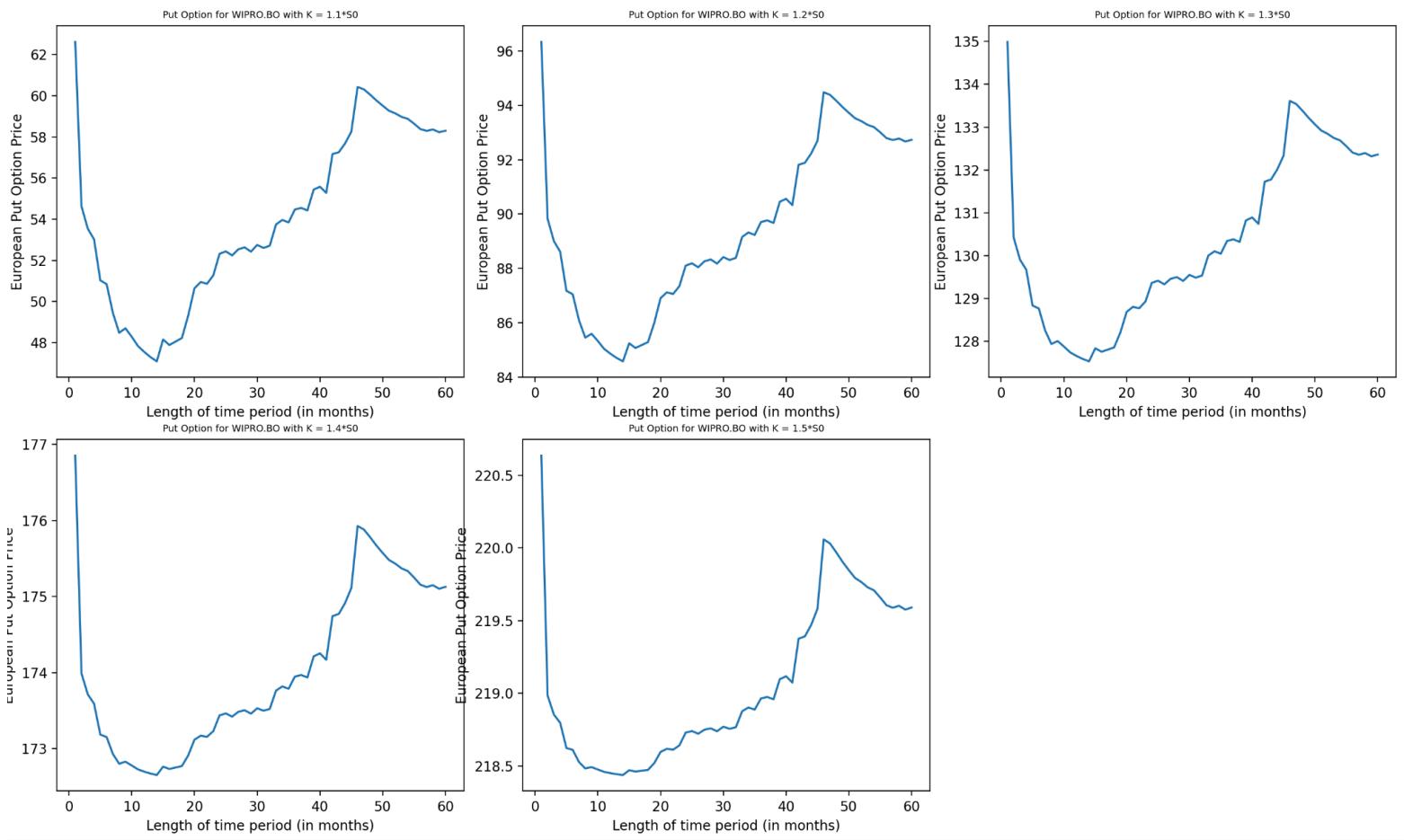


## Plots for Call Option, PUT Option and Volatility - stocks in Bsedata1:

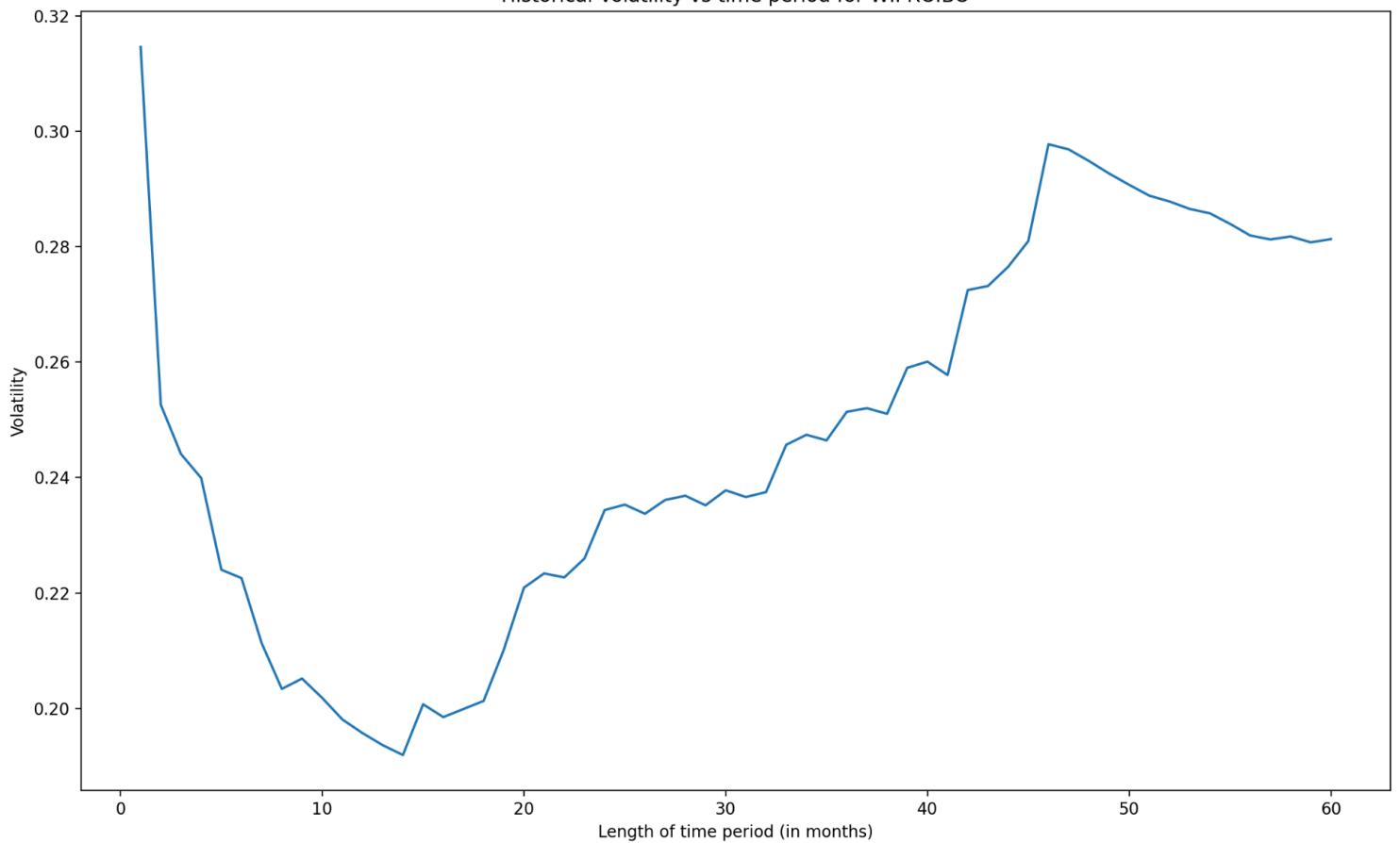
### 1) WIPRO.BS



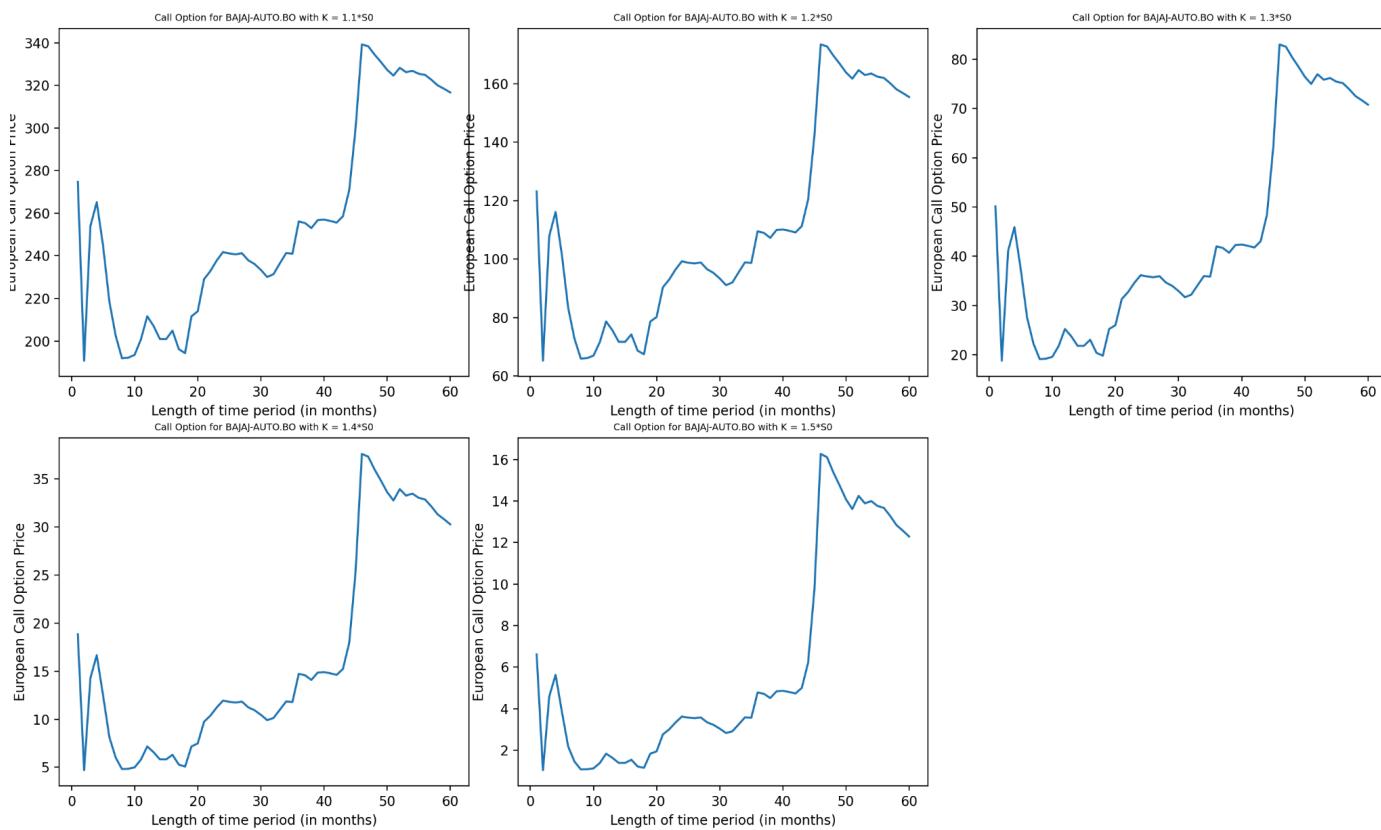
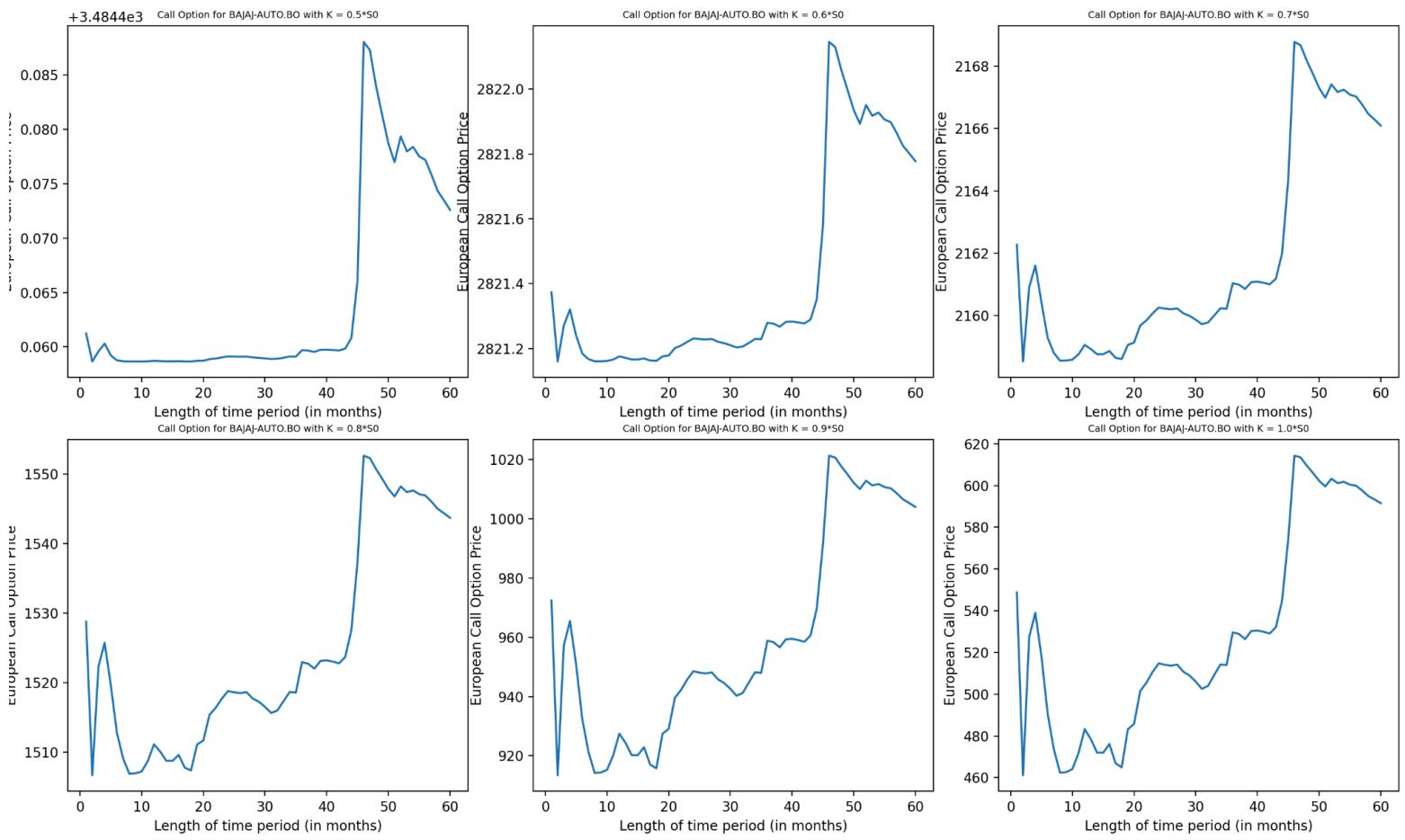


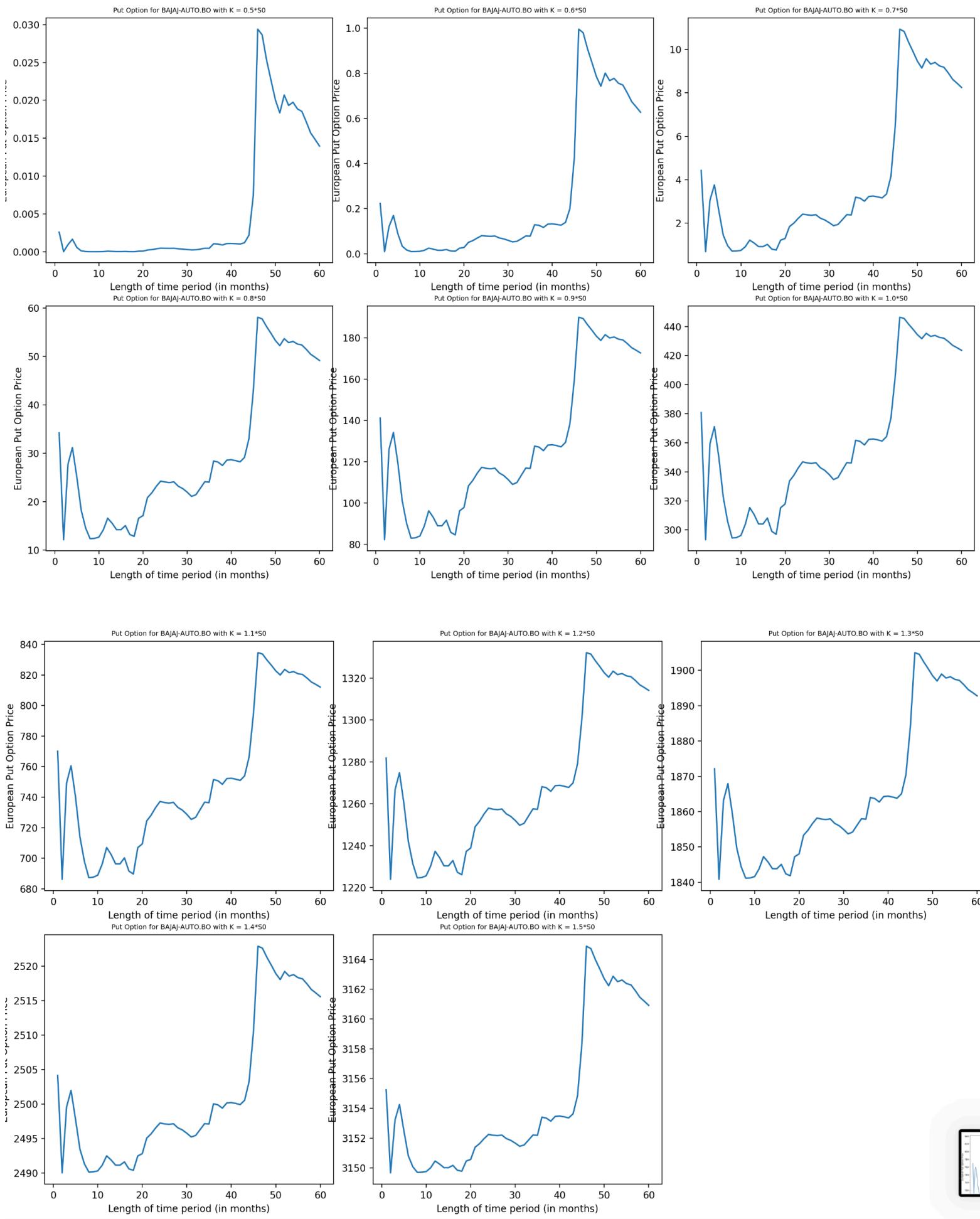


Historical Volatility vs time period for WIPRO.BO

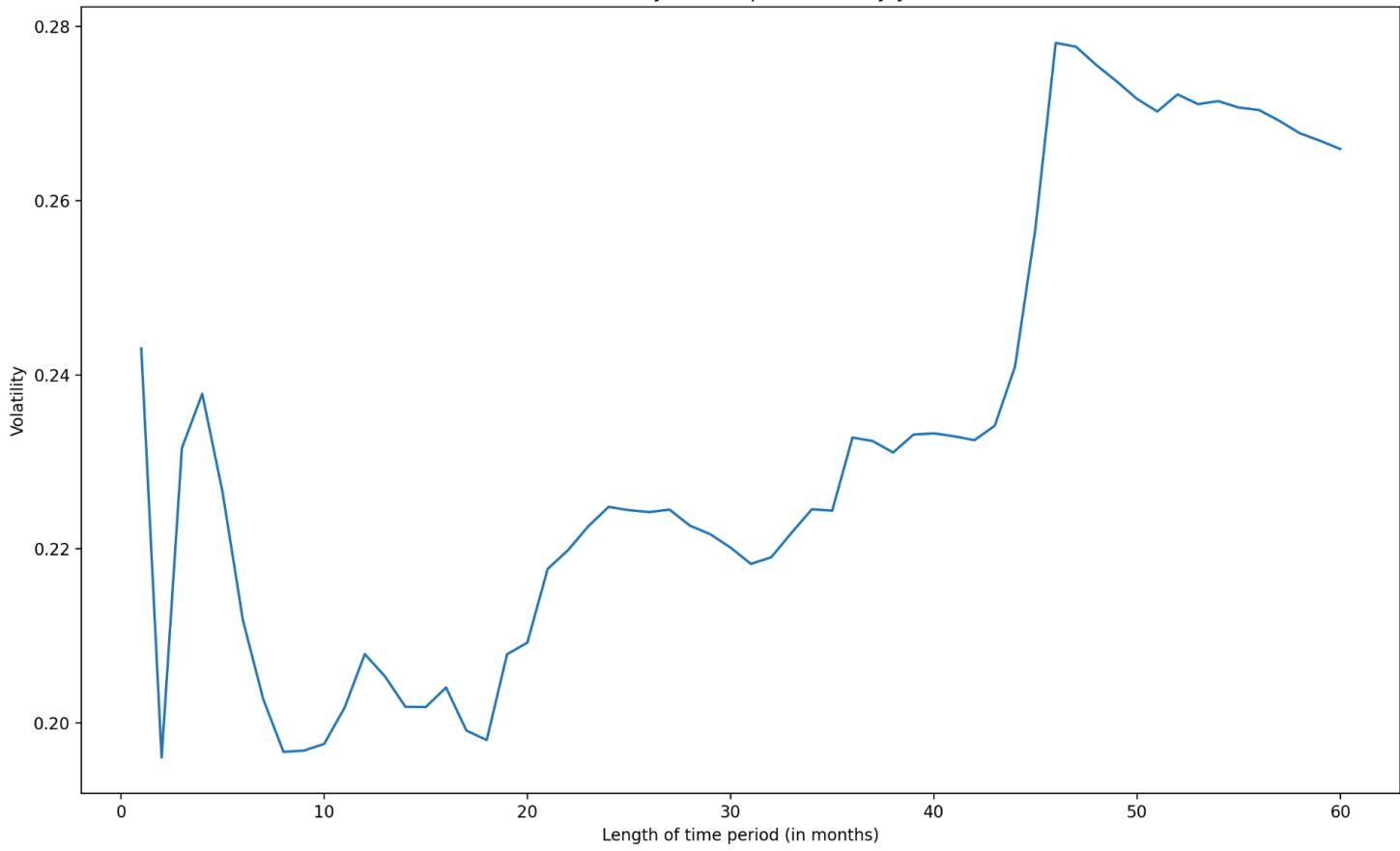


## 2) BAJAJ.BO

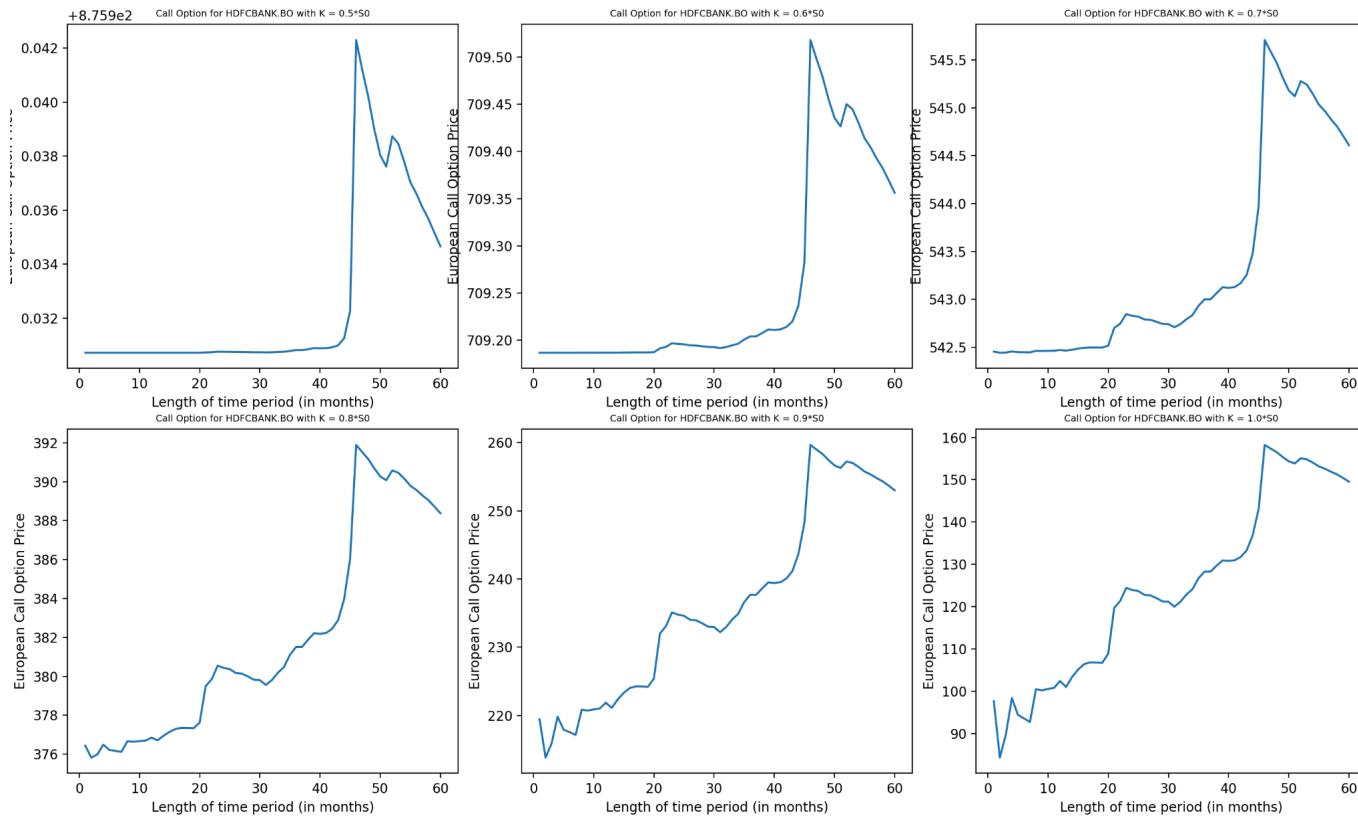


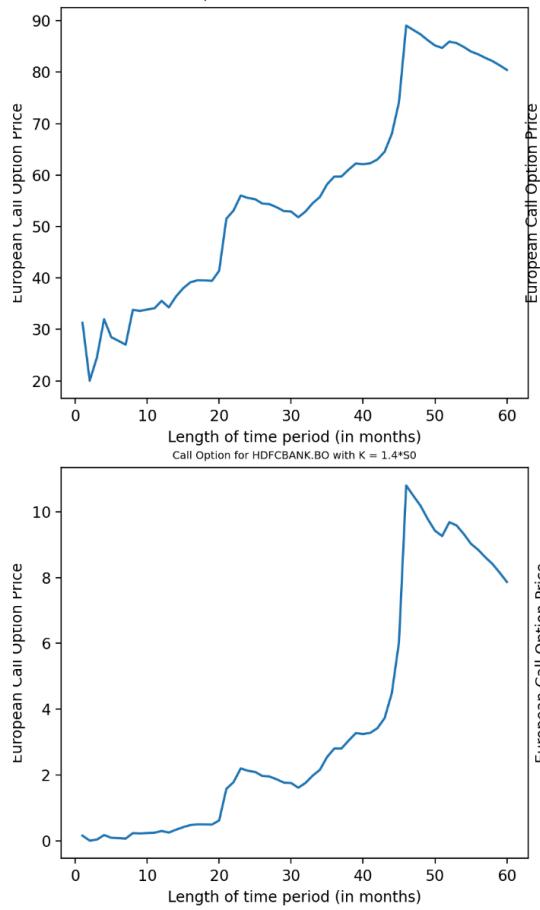
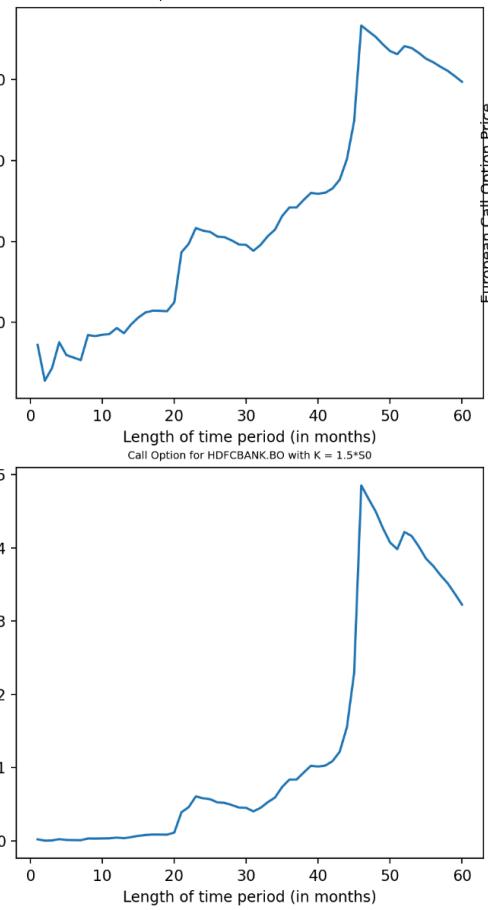
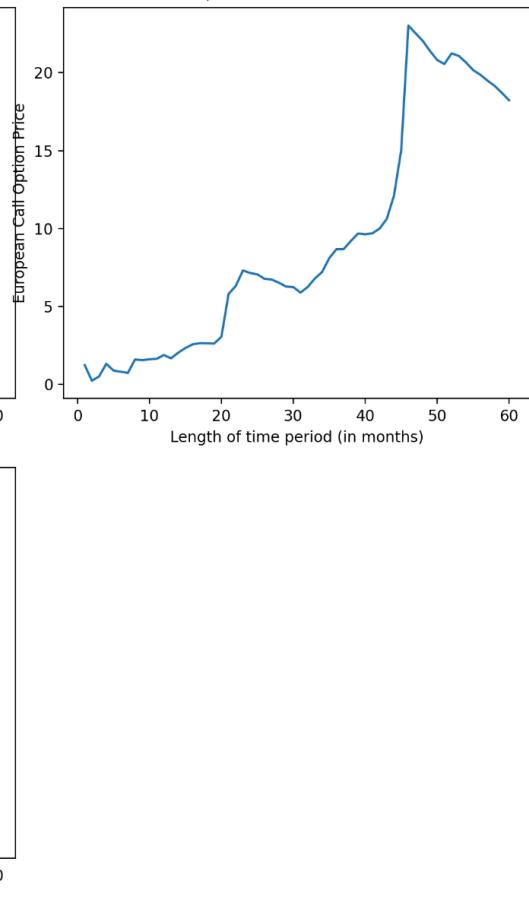
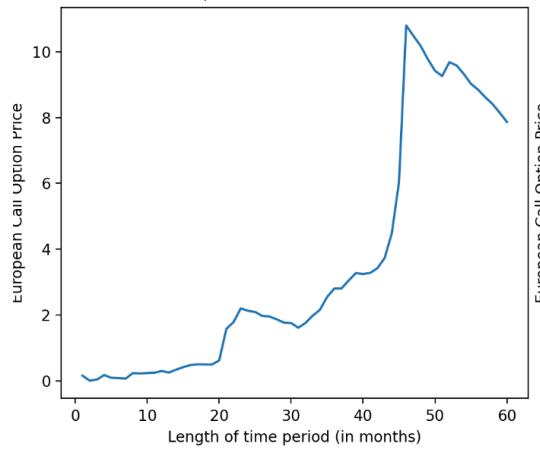
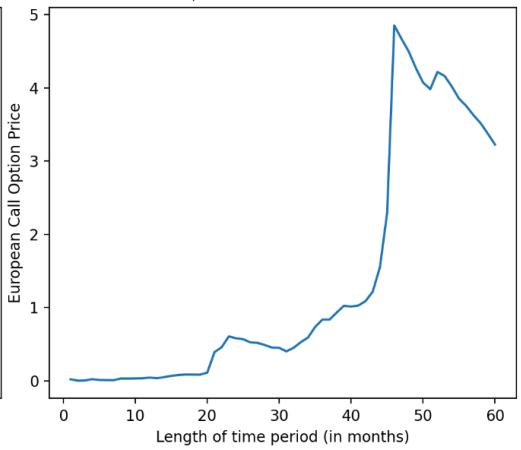
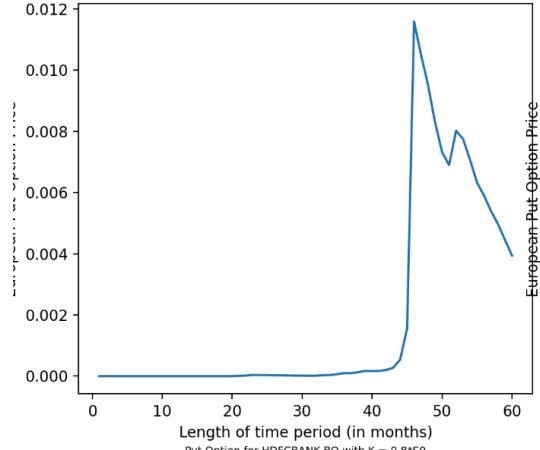
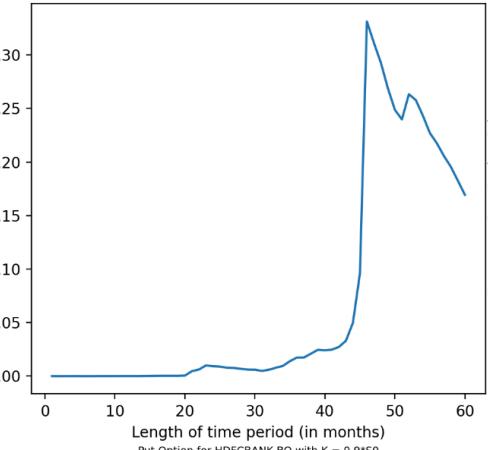
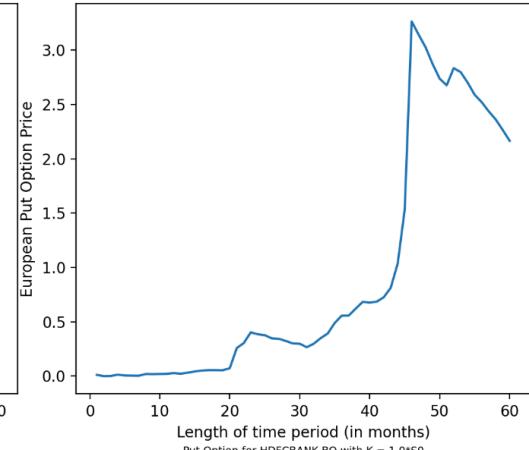
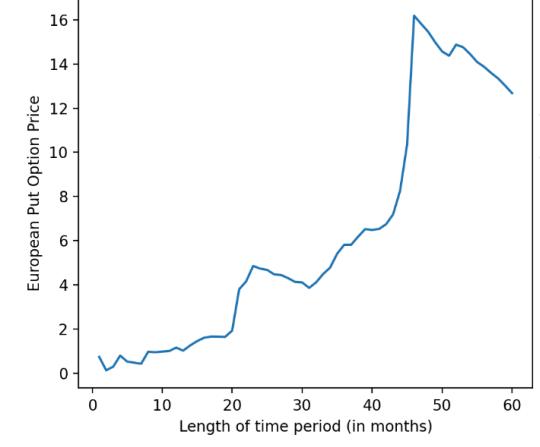
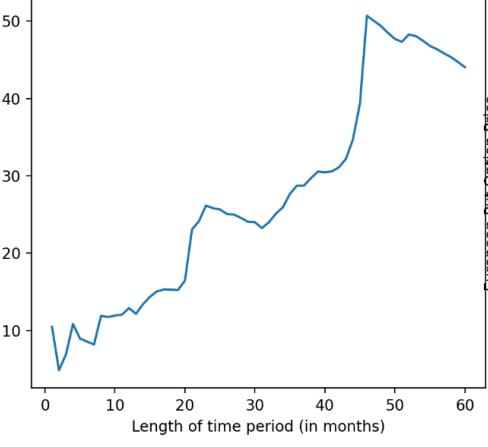
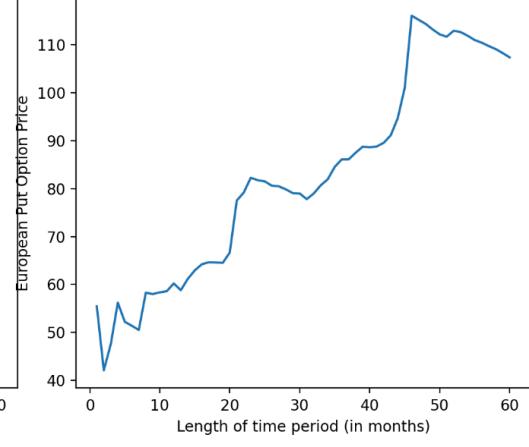


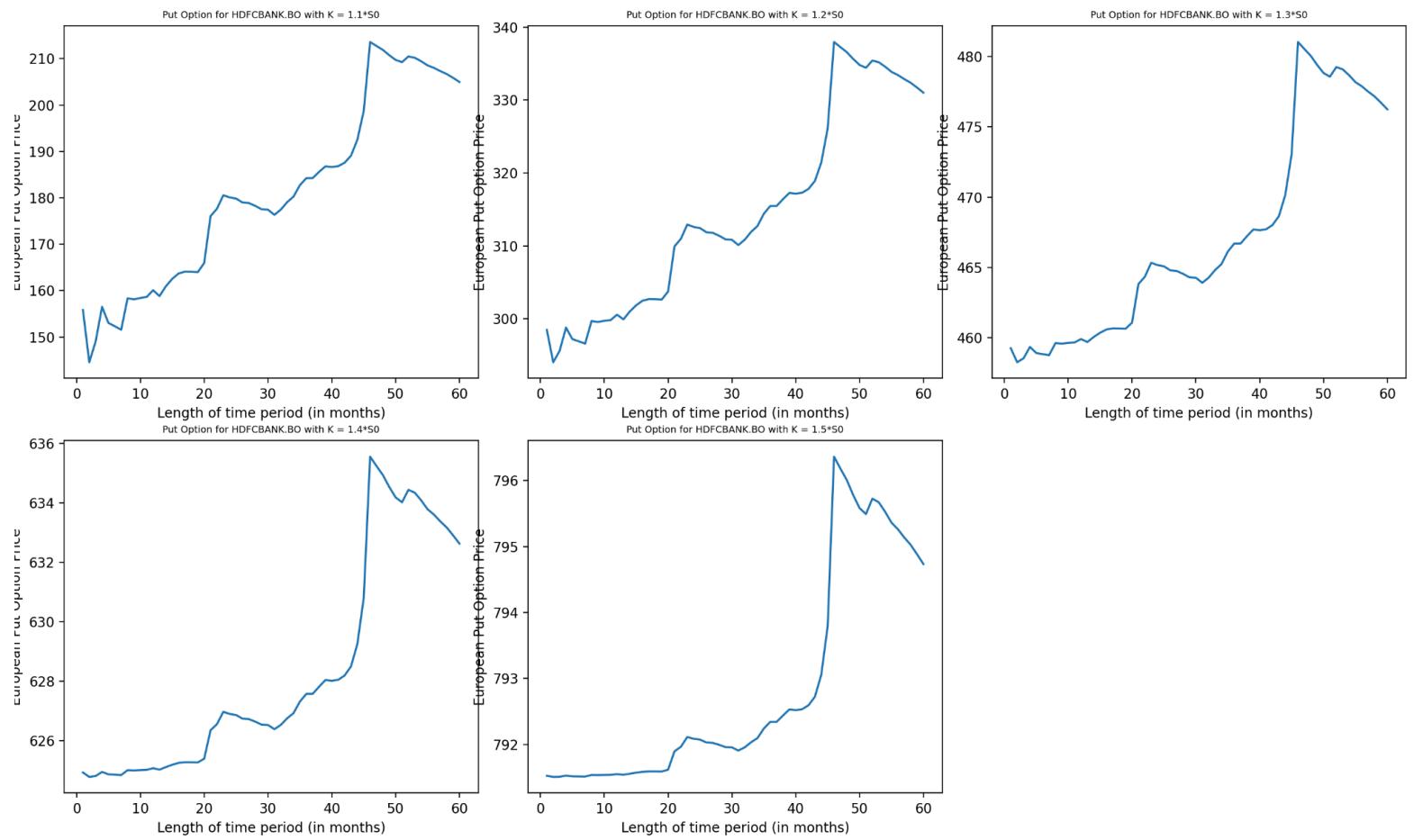
Historical Volatility vs time period for BAJAJ-AUTO.BO



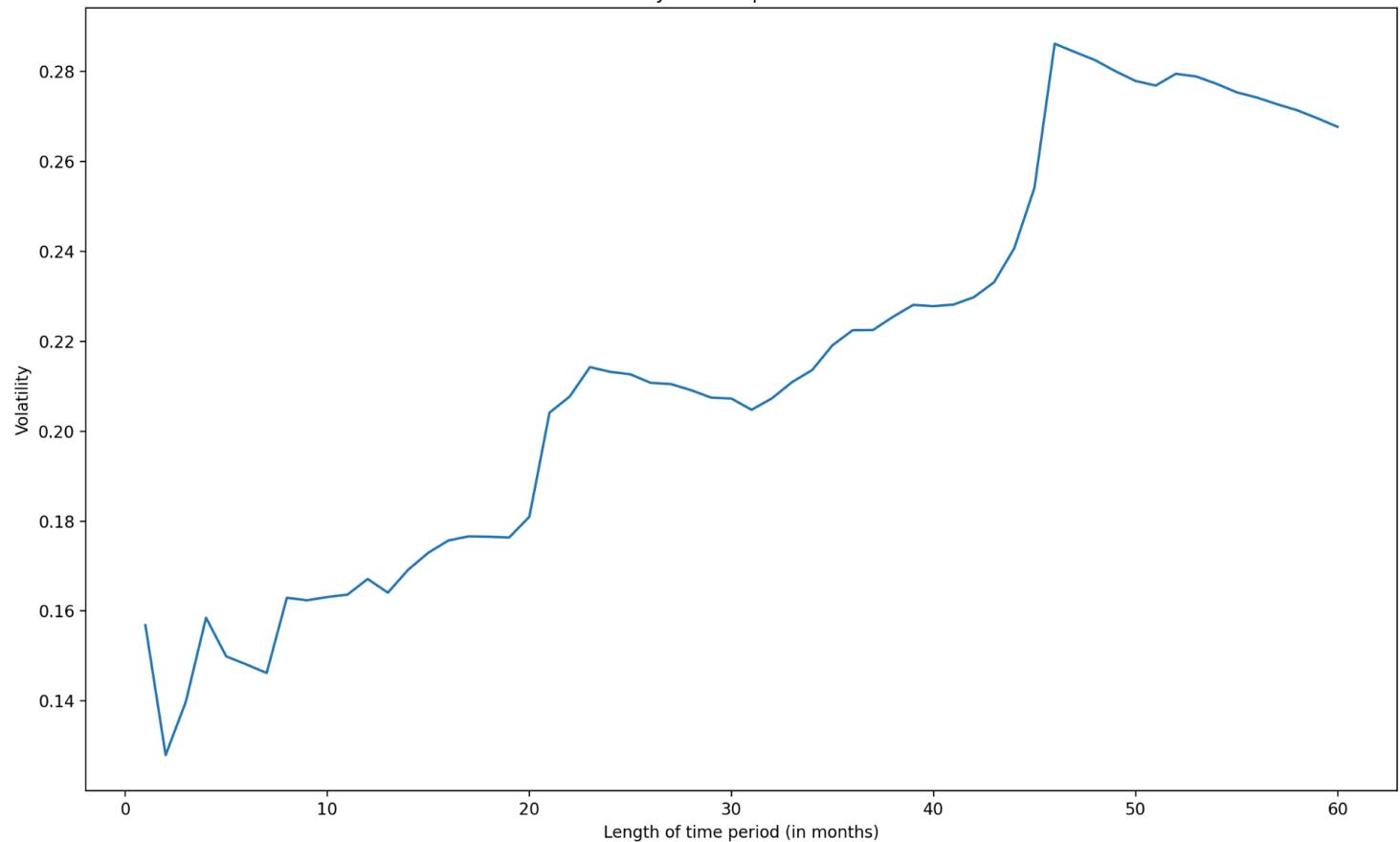
### 3) HDFCBANK.BO



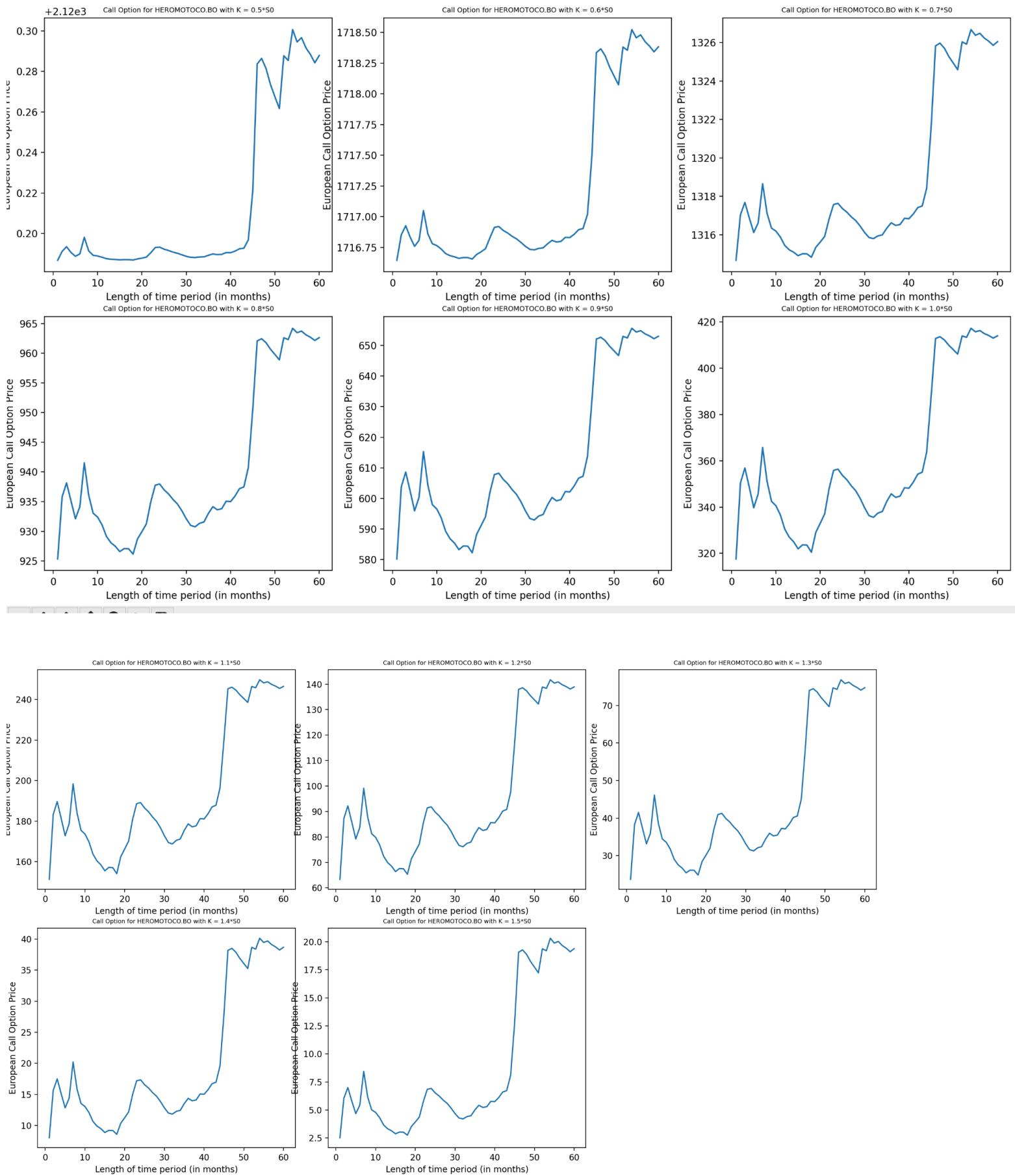
Call Option for HDFCBANK.BO with  $K = 1.1*50$ Call Option for HDFCBANK.BO with  $K = 1.2*50$ Call Option for HDFCBANK.BO with  $K = 1.3*50$ Call Option for HDFCBANK.BO with  $K = 1.4*50$ Call Option for HDFCBANK.BO with  $K = 1.5*50$ Put Option for HDFCBANK.BO with  $K = 0.5*50$ Put Option for HDFCBANK.BO with  $K = 0.6*50$ Put Option for HDFCBANK.BO with  $K = 0.7*50$ Put Option for HDFCBANK.BO with  $K = 0.8*50$ Put Option for HDFCBANK.BO with  $K = 0.9*50$ Put Option for HDFCBANK.BO with  $K = 1.0*50$ 

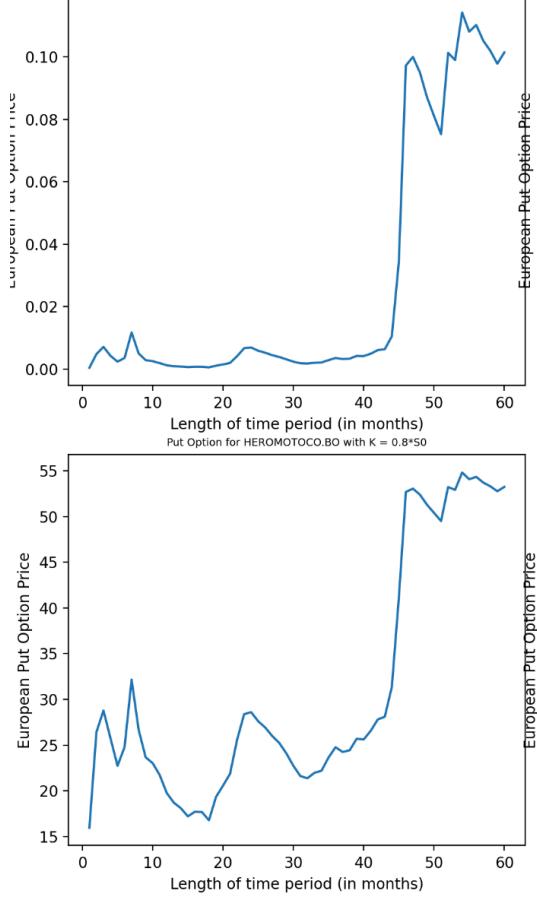
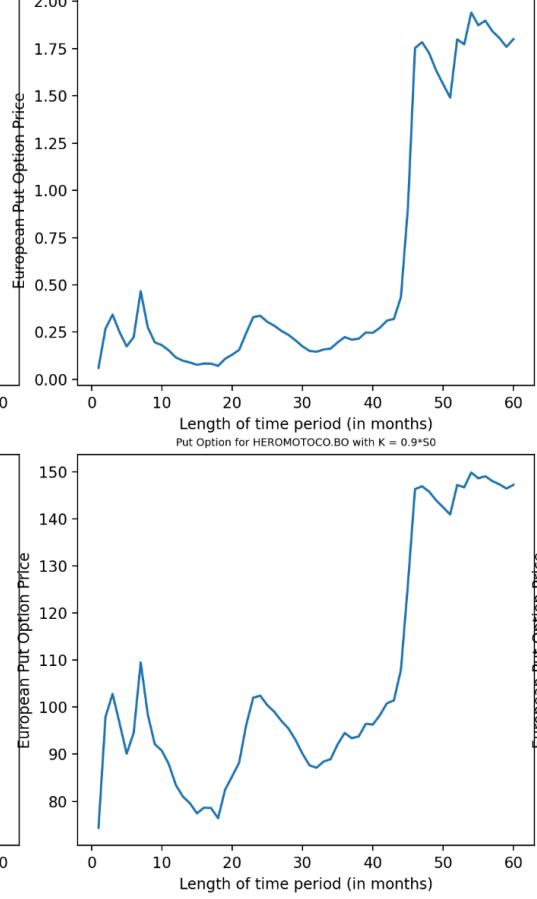
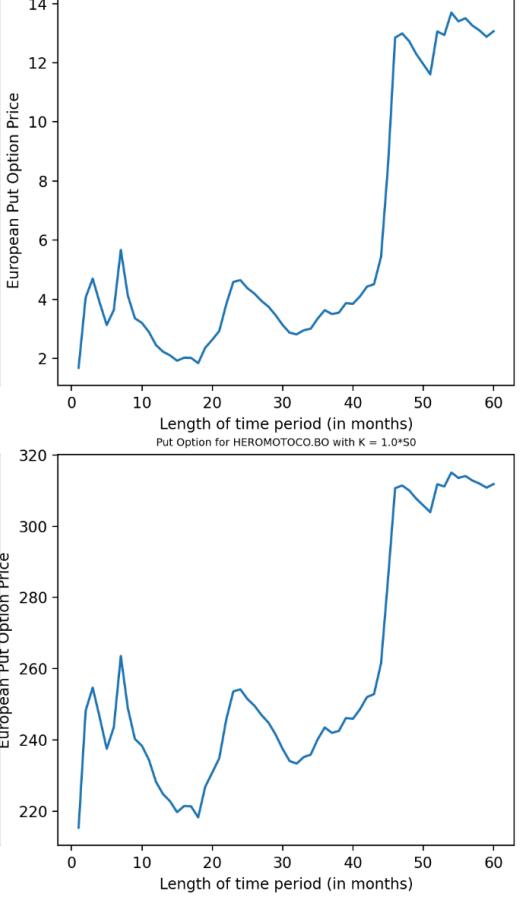
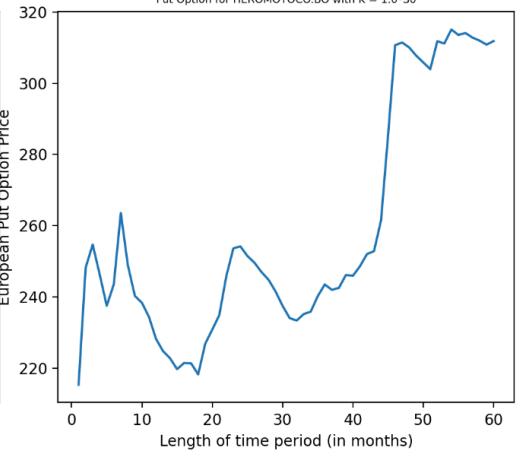
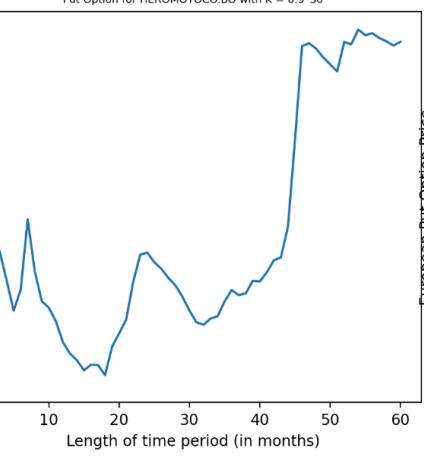
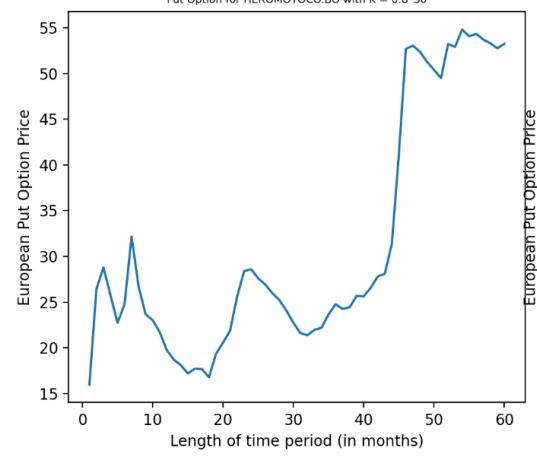
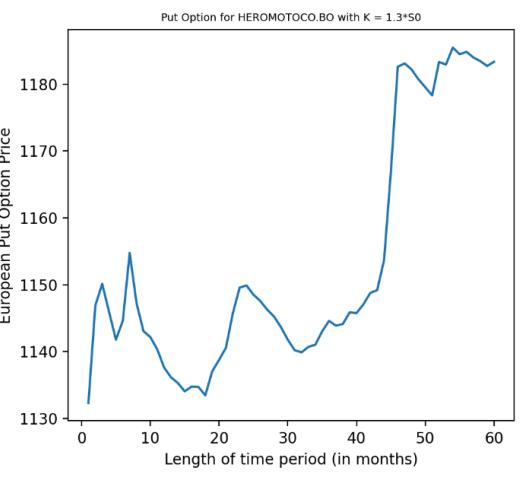
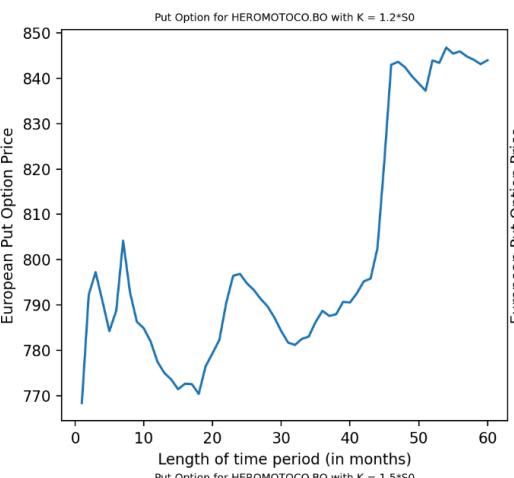
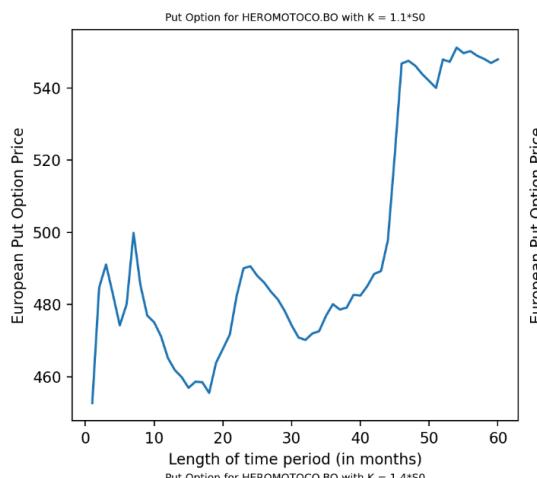
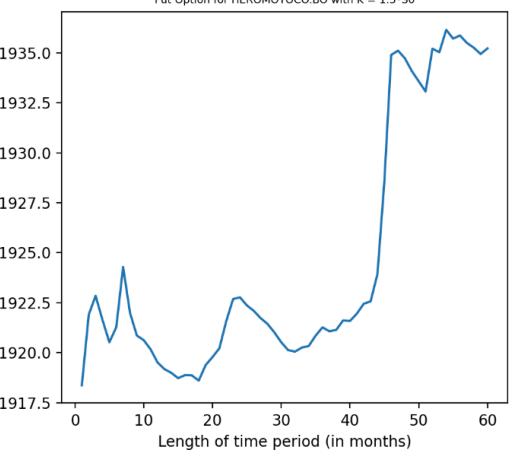
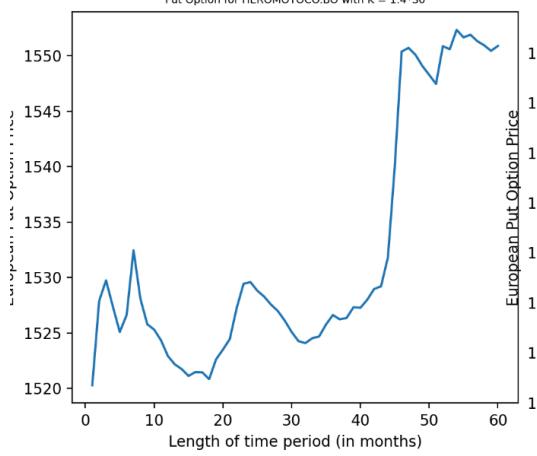


Historical Volatility vs time period for HDFCBANK.BO

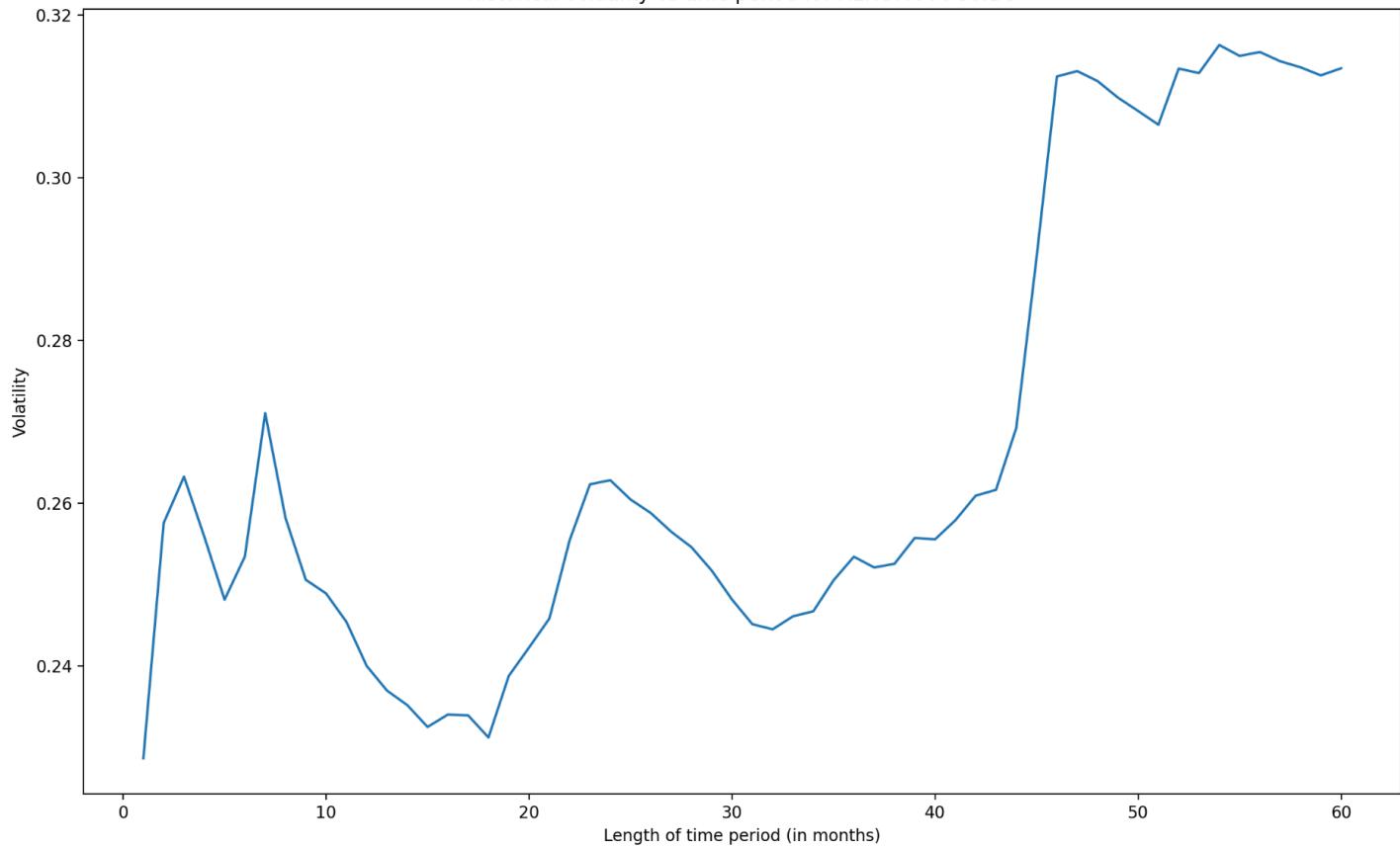


#### 4) HEROMOTOCO.BO

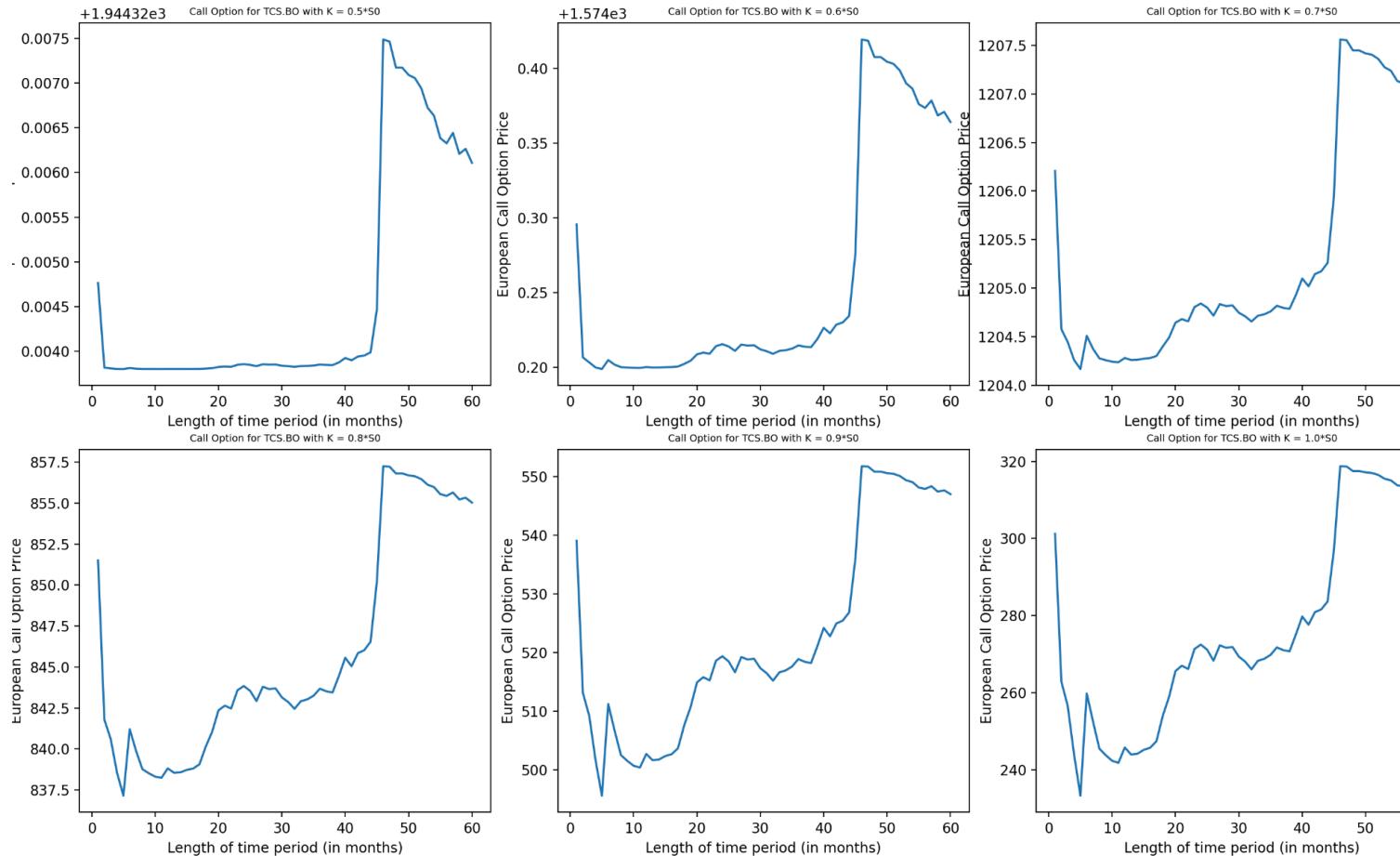


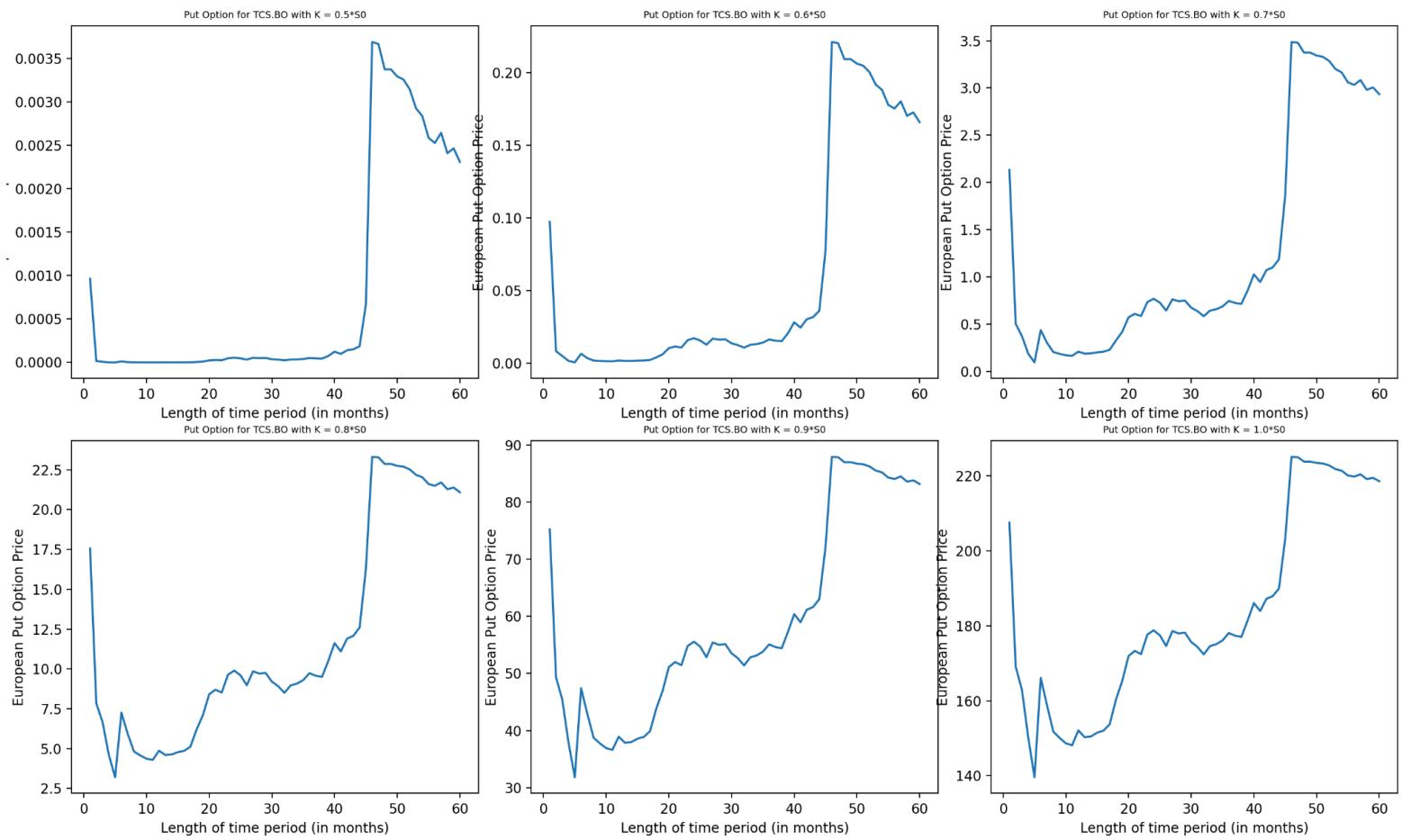
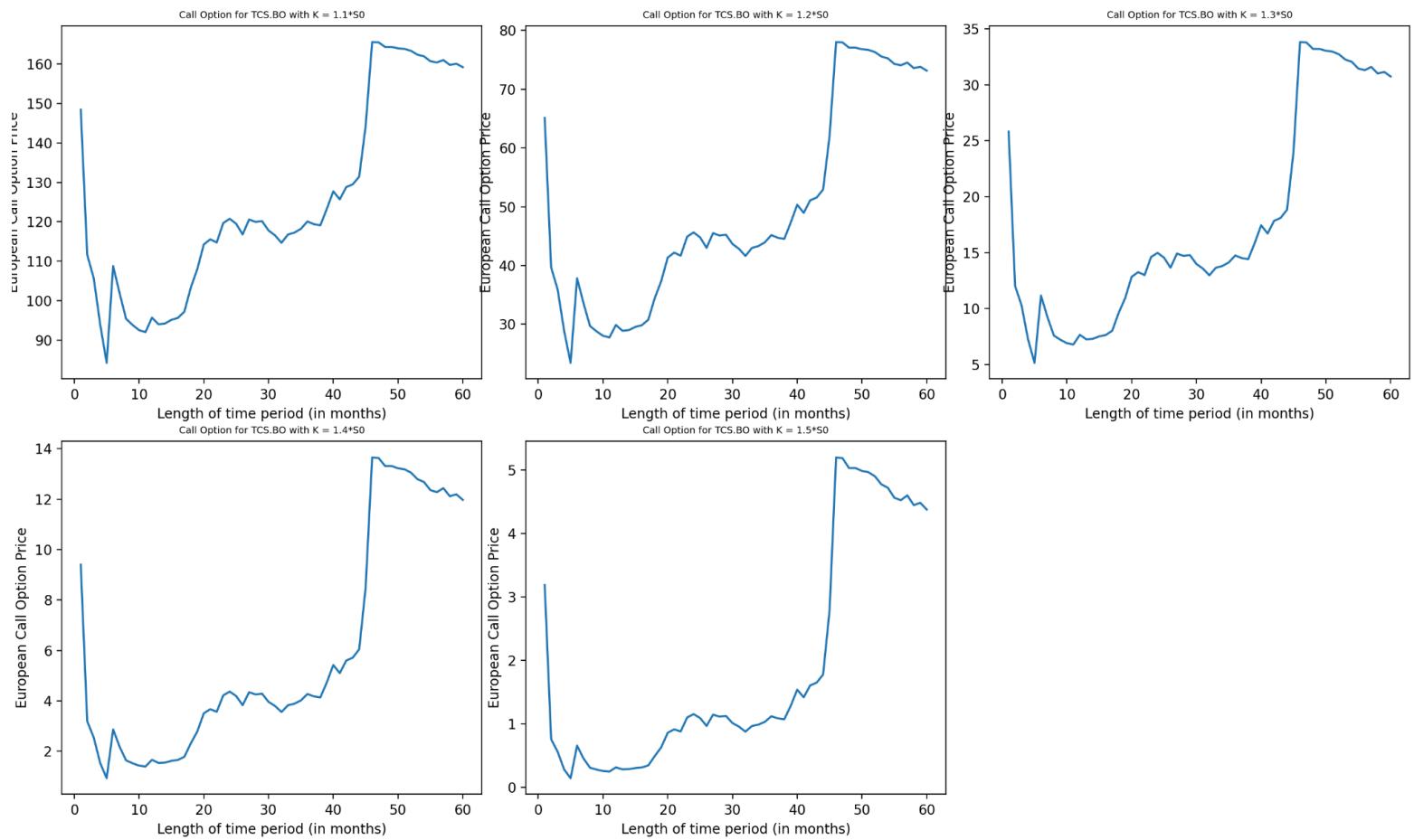
Put Option for HEROMOTOCO.BO with  $K = 0.5*50$ Put Option for HEROMOTOCO.BO with  $K = 0.6*50$ Put Option for HEROMOTOCO.BO with  $K = 0.7*50$ Put Option for HEROMOTOCO.BO with  $K = 0.8*50$ Put Option for HEROMOTOCO.BO with  $K = 1.1*50$ Put Option for HEROMOTOCO.BO with  $K = 1.4*50$ 

Historical Volatility vs time period for HEROMOTOCO.BO



## 5) TCS.BO





Historical Volatility vs time period for TCS.BO

