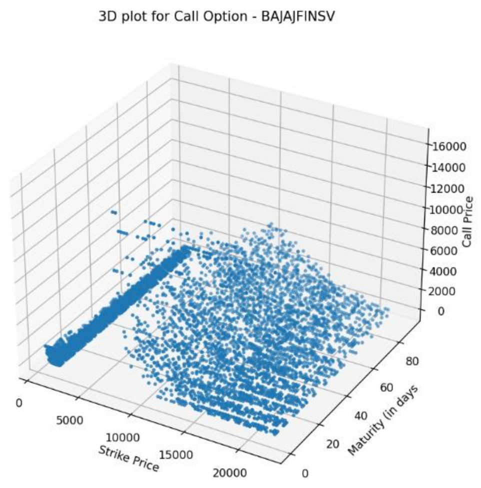
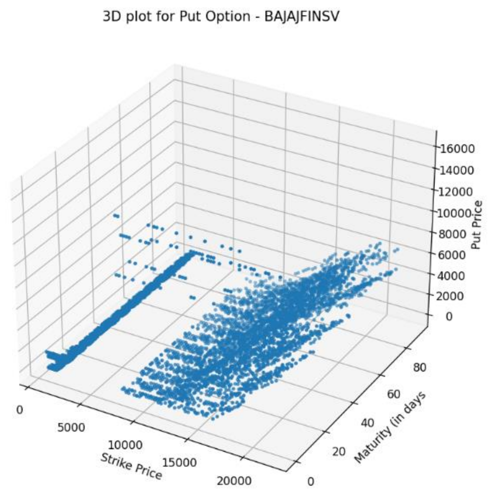
MA374 – Financial Engineering II

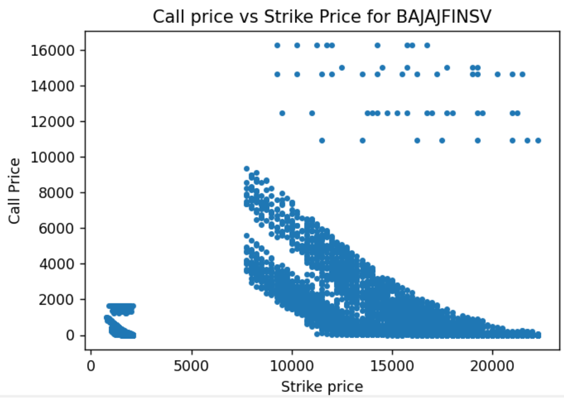
LAB 09 Report

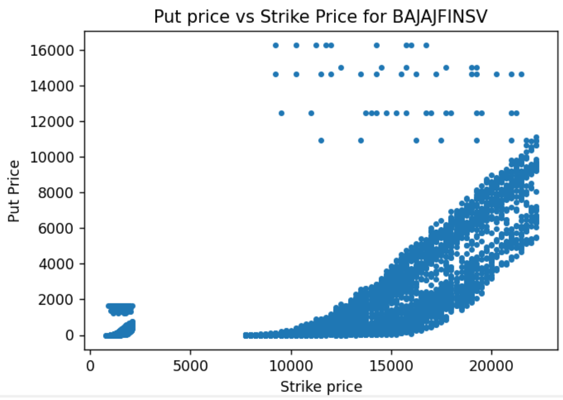
-Aman Kumar (200123007)

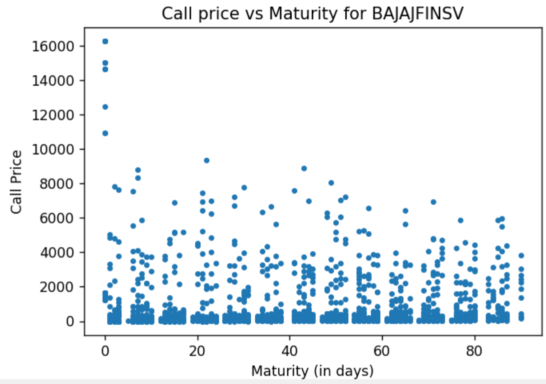
Part A –

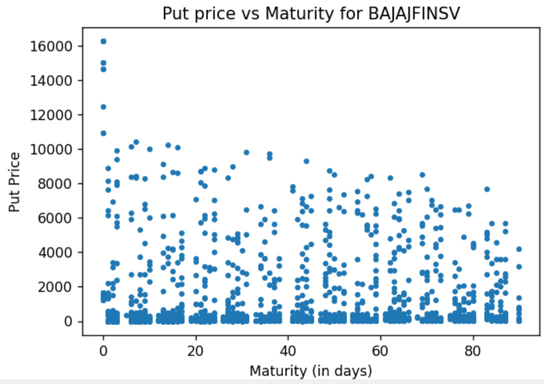


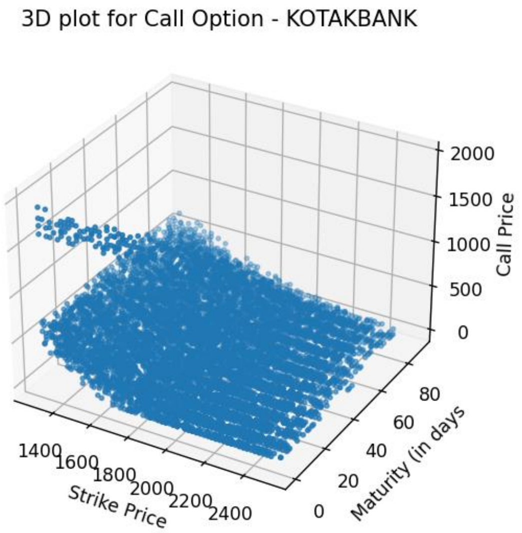


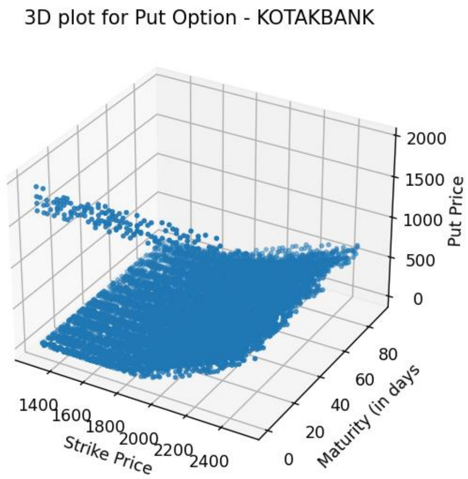


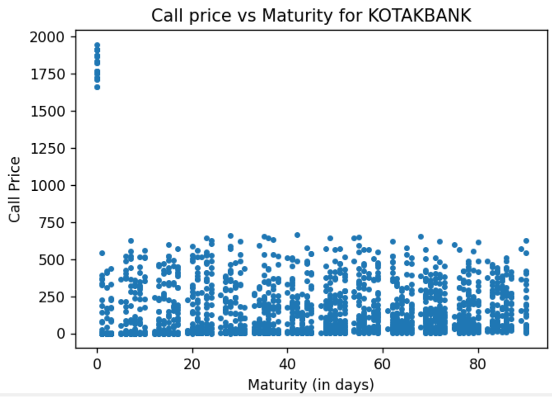


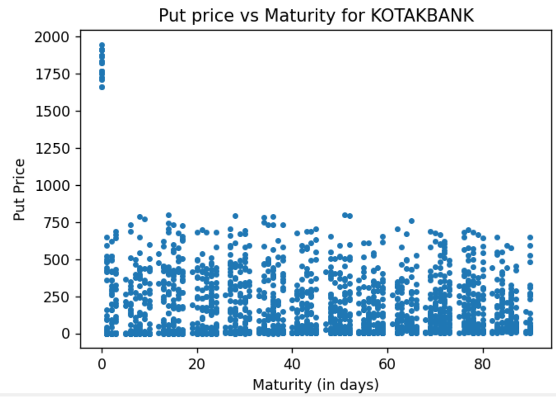

Call price vs Maturity for BAJAJFINSV
Call Price
Maturity (in days)

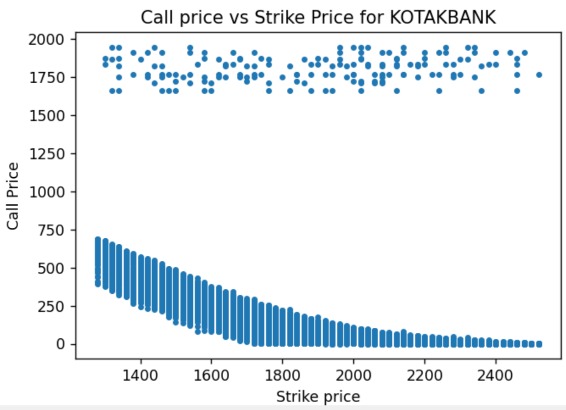

Put price vs Maturity for BAJAJFINSV
Put Price
Maturity (in days)

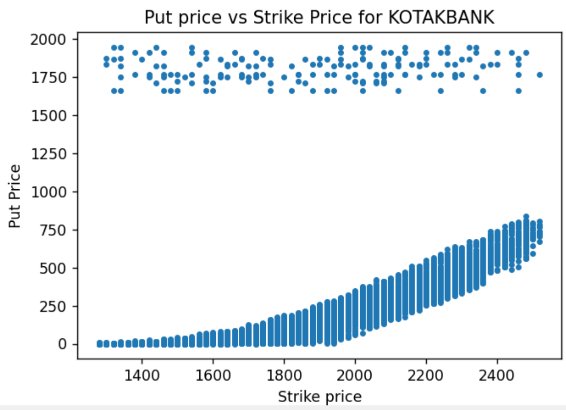

3D plot for Call Option - KOTAKBANK
Call Price
Strike Price
Maturity (in days

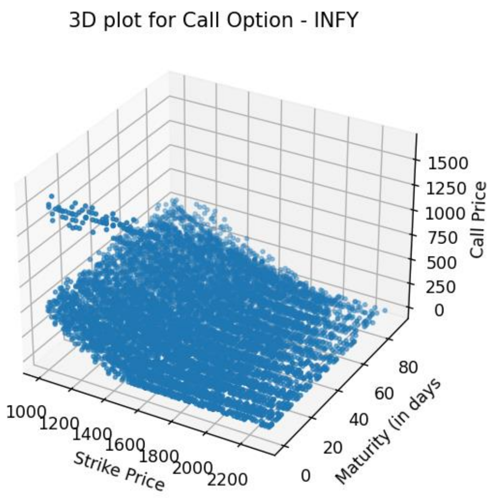

3D plot for Put Option - KOTAKBANK
Put Price
Strike Price
Maturity (in days

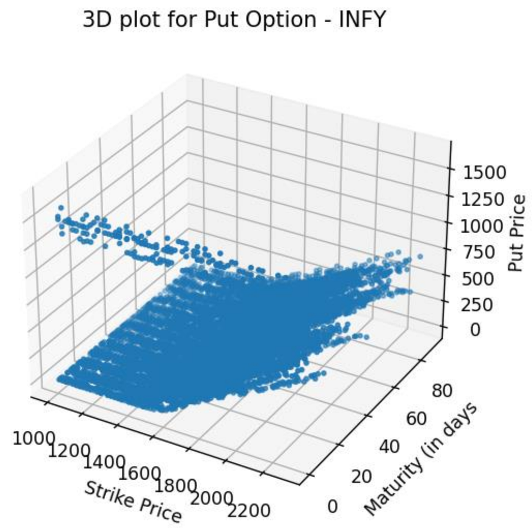

Call price vs Maturity for KOTAKBANK
Call Price
Maturity (in days)

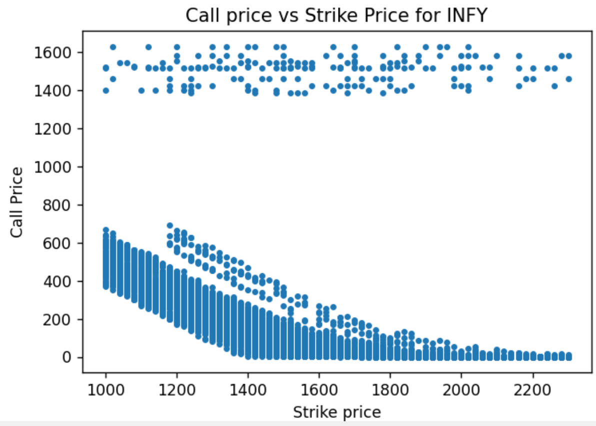

Put price vs Maturity for KOTAKBANK
Put Price
Maturity (in days)

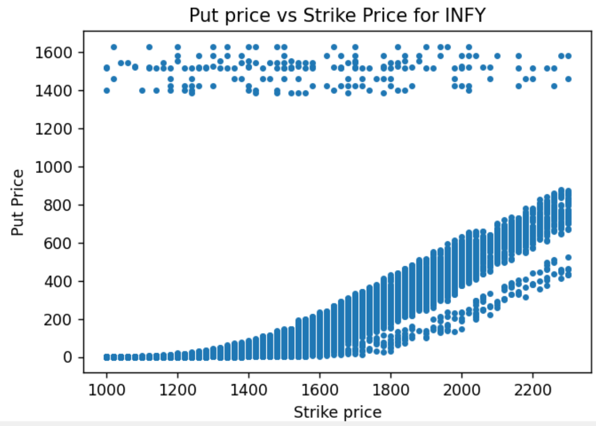

Call price vs Strike Price for KOTAKBANK
Call Price
Strike price

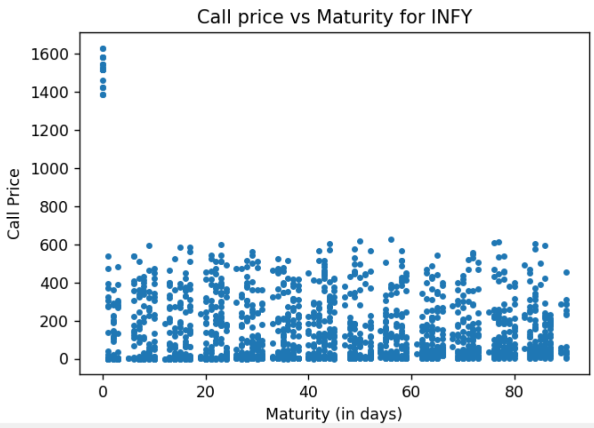

Put price vs Strike Price for KOTAKBANK
Put Price
Strike price

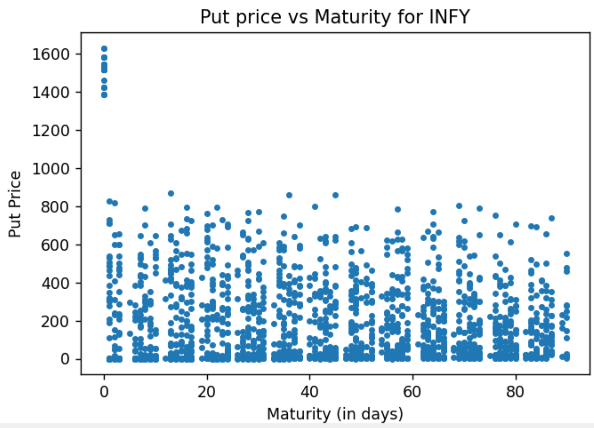

3D plot for Call Option - INFY
Strike Price
Maturity (in days)
Call Price

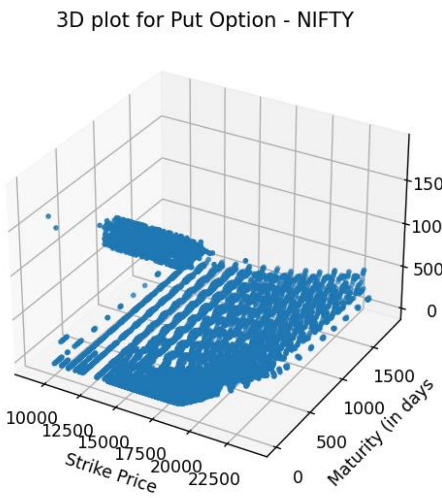

3D plot for Put Option - INFY
Strike Price
Maturity (in days)
Put Price

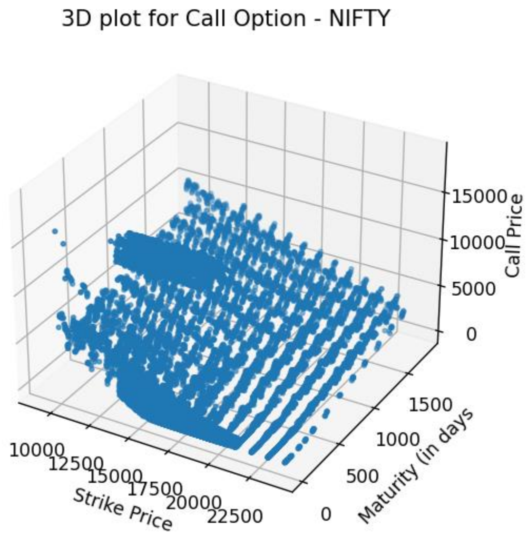

Call price vs Strike Price for INFY
Call Price
Strike price

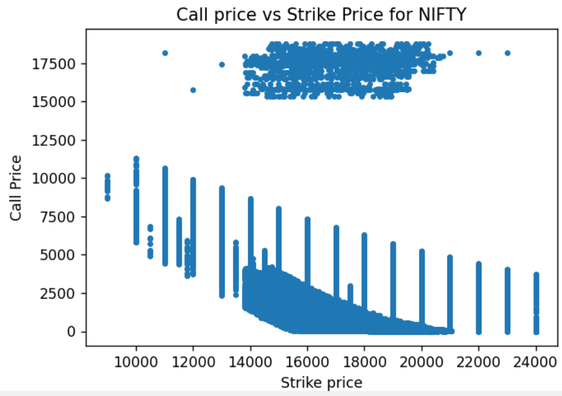

Put price vs Strike Price for INFY
Put Price
Strike price

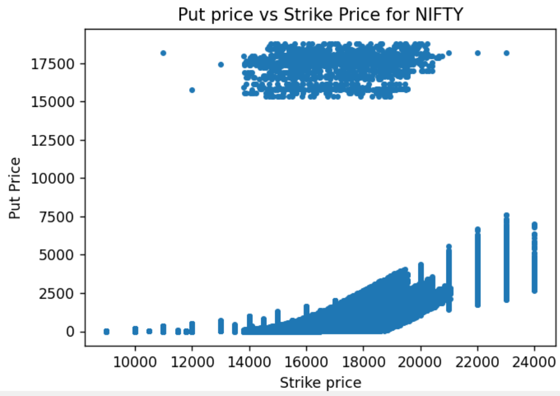

Call price vs Maturity for INFY
Call Price
Maturity (in days)

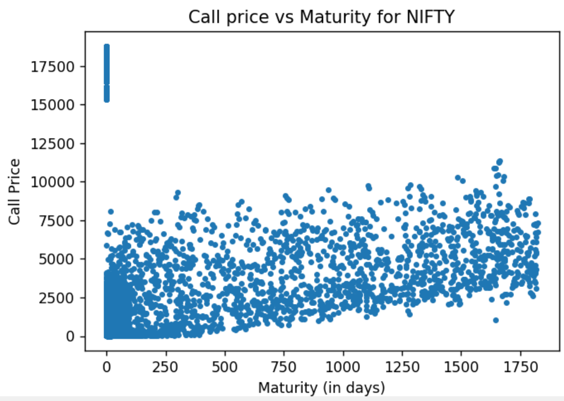

Put price vs Maturity for INFY
Put Price
Maturity (in days)

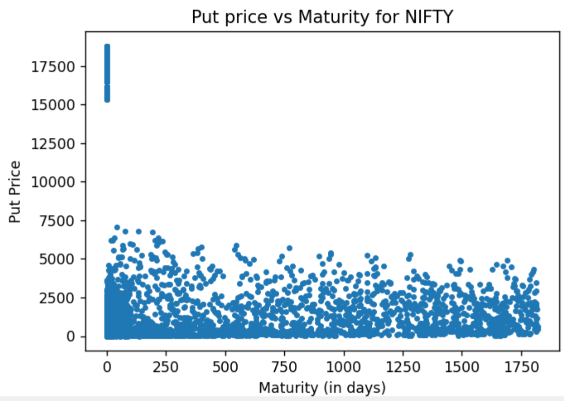

3D plot for Put Option - NIFTY
Strike Price
10000 12500 15000 17500 20000 22500
Maturity (in days
0 500 1000 1500
Put Price
0 5000 10000 15000


3D plot for Call Option - NIFTY
Strike Price
10000 12500 15000 17500 20000 22500
Maturity (in days
0 500 1000 1500
Call Price
0 5000 10000 15000

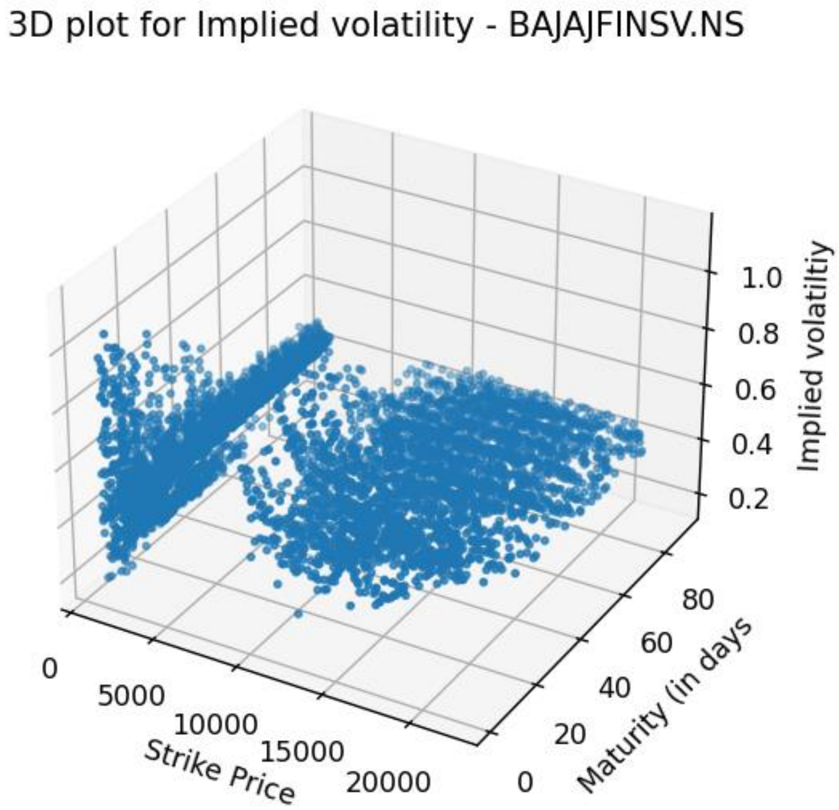

Call price vs Strike Price for NIFTY
Call Price
0 2500 5000 7500 10000 12500 15000 17500
Strike price
10000 12000 14000 16000 18000 20000 22000 24000

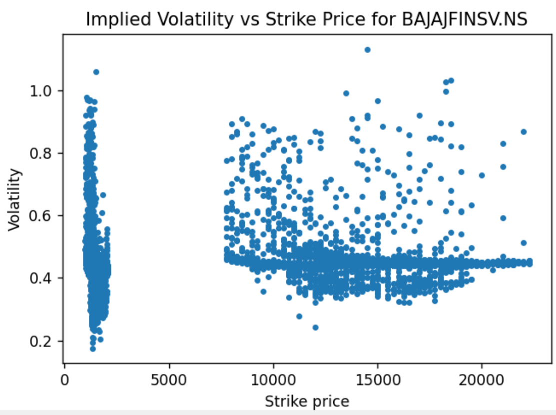

Put price vs Strike Price for NIFTY
Put Price
0 2500 5000 7500 10000 12500 15000 17500
Strike price
10000 12000 14000 16000 18000 20000 22000 24000

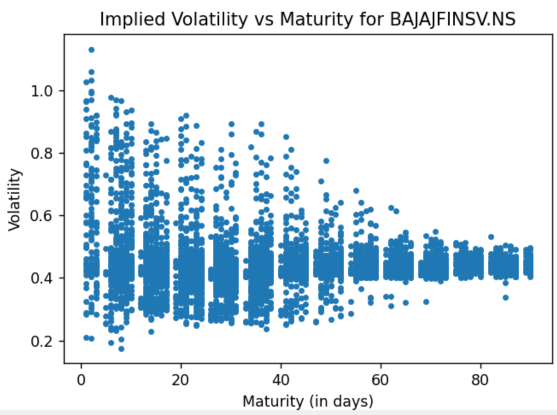

Call price vs Maturity for NIFTY
Call Price
0 2500 5000 7500 10000 12500 15000 17500
Maturity (in days)
0 250 500 750 1000 1250 1500 1750

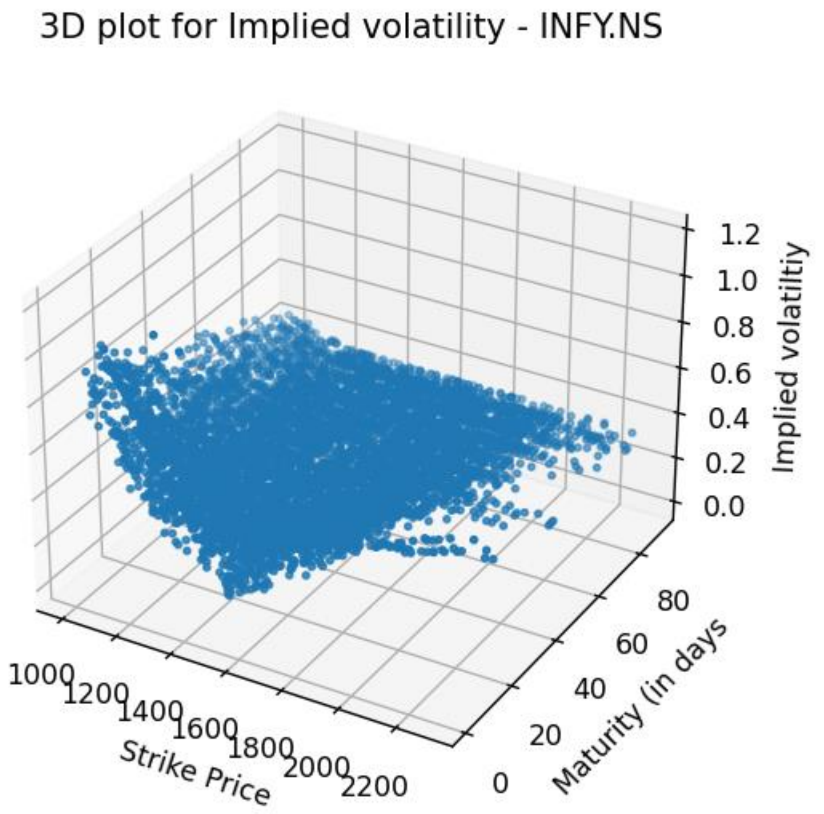

Put price vs Maturity for NIFTY
Put Price
0 2500 5000 7500 10000 12500 15000 17500
Maturity (in days)
0 250 500 750 1000 1250 1500 1750

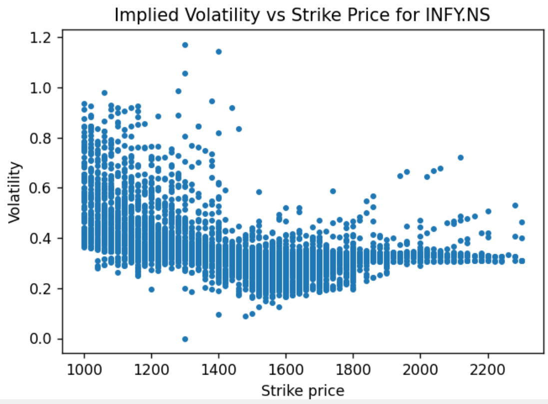
PART B

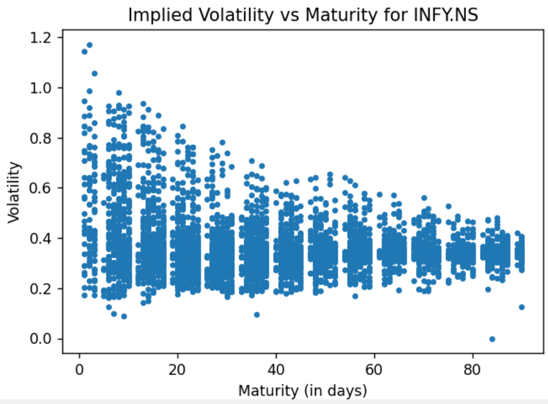

3D plot for Implied volatility - BAJAJFINSV.NS
Implied volatiltiy
1.0
0.8
0.6
0.4
0.2
0
5000
10000
15000
20000
Strike Price
0
20
40
60
80
Maturity (in days)

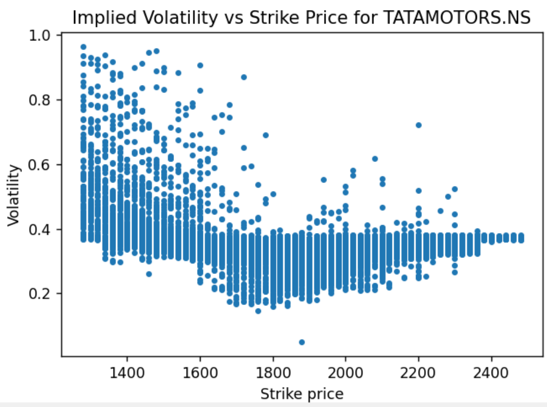

Implied Volatility vs Strike Price for BAJAJFINSV.NS
Volatility
1.0
0.8
0.6
0.4
0.2
0
5000
10000
15000
20000
Strike price

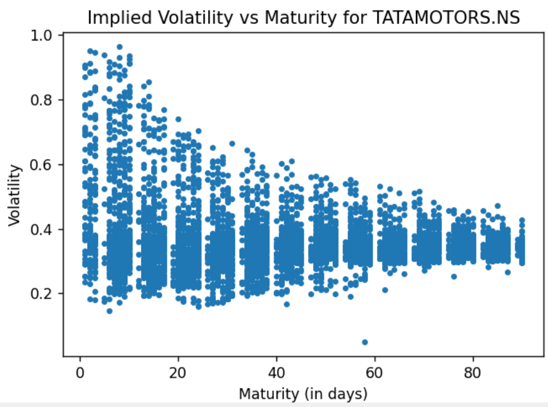

Implied Volatility vs Maturity for BAJAJFINSV.NS
Volatility
1.0
0.8
0.6
0.4
0.2
0
20
40
60
80
Maturity (in days)

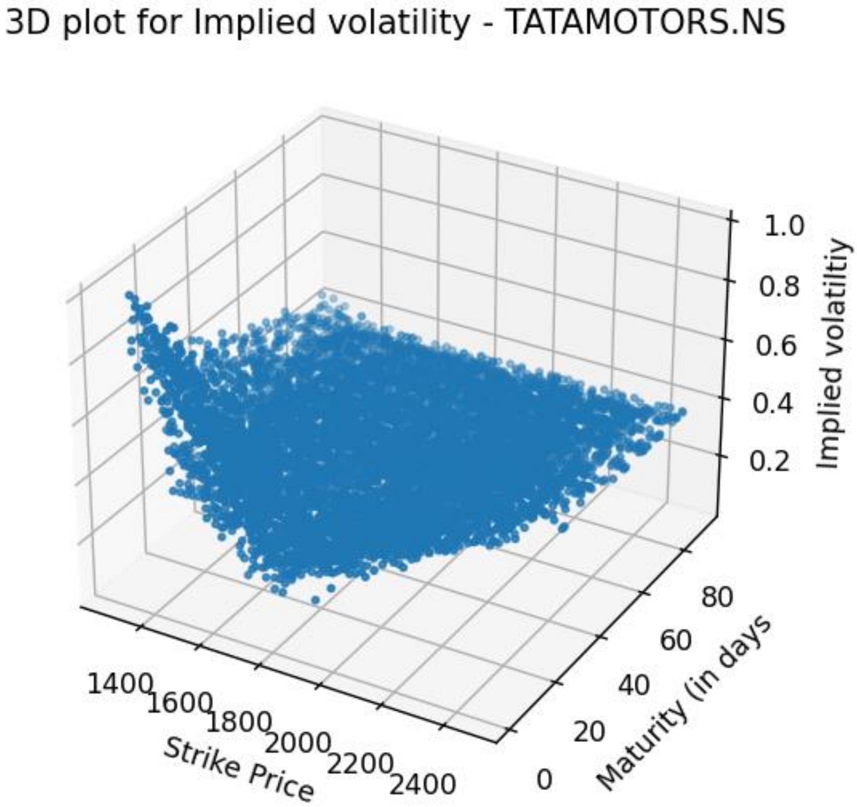

3D plot for Implied volatility - INFY.NS
Implied volatiltiy
Maturity (in days)
Strike Price
1000
1200
1400
1600
1800
2000
2200
0
20
40
60
80
0.0
0.2
0.4
0.6
0.8
1.0
1.2


Implied Volatility vs Strike Price for INFY.NS
Volatility
Strike price


Implied Volatility vs Maturity for INFY.NS
Volatility
Maturity (in days)

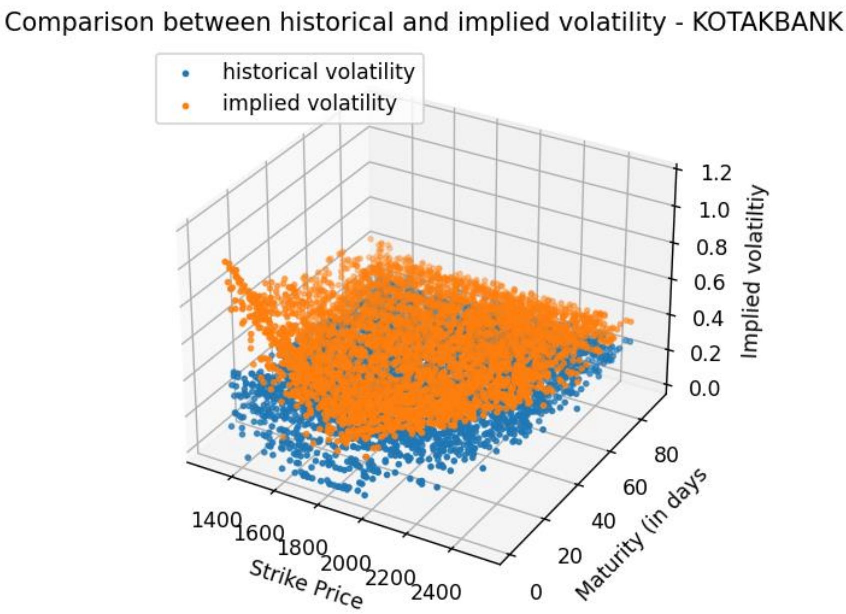

Implied Volatility vs Strike Price for TATAMOTORS.NS
Volatility
Strike price


Implied Volatility vs Maturity for TATAMOTORS.NS
Volatility
Maturity (in days)



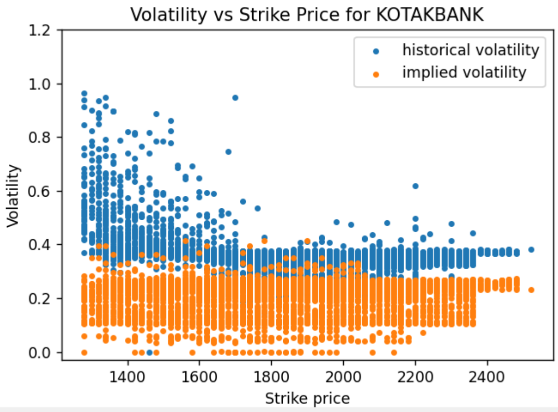
3D plot for Implied volatility - TATAMOTORS.NS
1.0
0.8
0.6
0.4
0.2
Implied volatiltiy
80
60
40
20
0
Maturity (in days
1400
1600
1800
2000
2200
2400
Strike Price

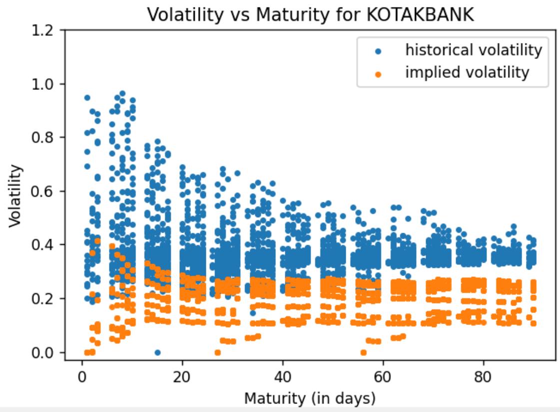
PART C

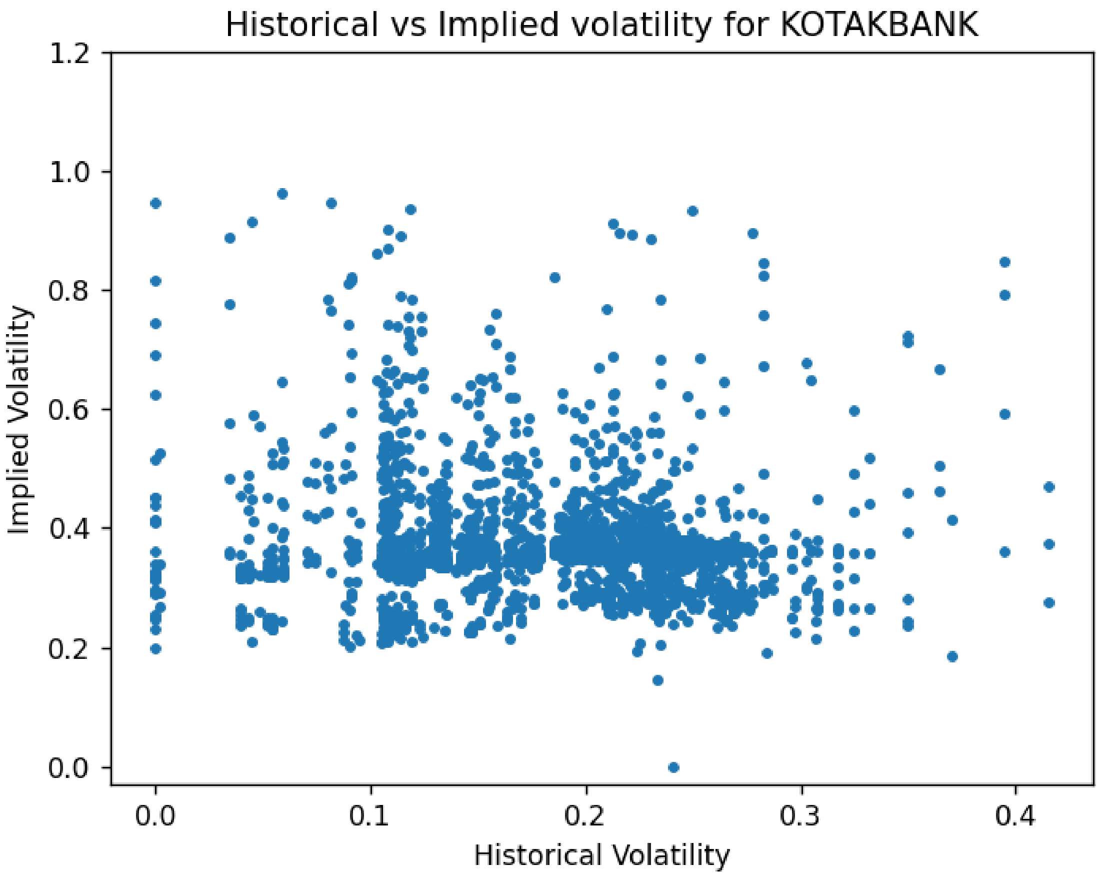


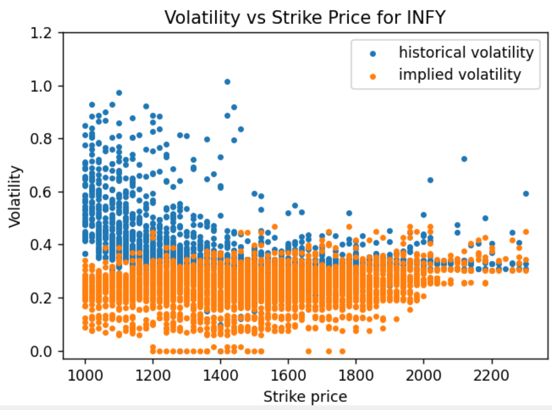
Comparison between historical and implied volatility - KOTAKBANK
historical volatility
implied volatility
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Implied volatiltiy
80
60
40
20
0
Maturity (in days
1400
1600
1800
2000
2200
2400
Strike Price

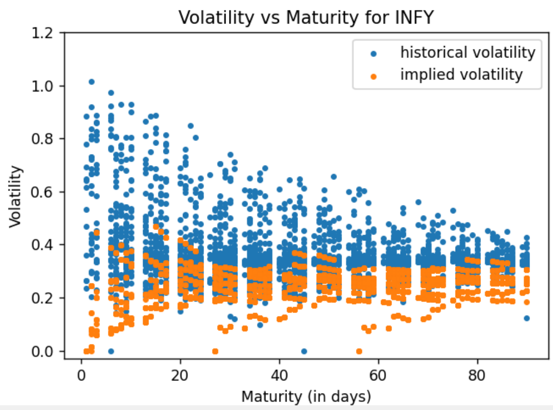
SI No.	Call Price	Stock Price (S0)	Maturity (in days)	Historical Volatility	Implied Volatility
1	2.2	1802.2	23	0.210044	0.36185
2	77.95	1802.2	23	0.210044	0.283839
3	104.25	1802.2	23	0.210044	0.274565
4	5.9	1802.2	23	0.210044	0.381793
5	307.65	1802.2	23	0.210044	0.341472
6	24.65	1802.2	51	0.233545	0.380367
7	221.6	1802.2	51	0.233545	0.37491
8	7.65	1802.2	51	0.233545	0.381134
9	17	1802.2	51	0.233545	0.380803
10	452	1802.2	51	0.233545	0.305847
11	1.1	1802.2	51	0.233545	0.381483
12	50.65	1802.2	51	0.233545	0.314473
13	8.55	1802.2	86	0.244185	0.380729
14	444.5	1802.2	86	0.244185	0.356561
15	263.1	1802.2	86	0.244185	0.373871
16	133.2	1802.2	86	0.244185	0.377508
17	426.4	1802.2	86	0.244185	0.359666
18	162.85	1802.2	86	0.244185	0.376807
19	35.05	1802.2	86	0.244185	0.379948
20	57.2	1779.4	22	0.211601	0.314872






Historical vs Implied volatility for KOTAKBANK
Implied Volatility
Historical Volatility
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.1
0.2
0.3
0.4


Volatility vs Strike Price for INFY
historical volatility
implied volatility
Volatility
Strike price
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1000
1200
1400
1600
1800
2000
2200


Volatility vs Maturity for INFY
historical volatility
implied volatility
Volatility
Maturity (in days)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80

```
  return derivative(wraps, point[var], dx = 1e-4)
*****************  For INFY  *****************
  SI No.    Call Price    Stock Price (S0)    Maturity (in days)    Historical Volatility    Implied Volatility
--------  ------------  ------------------  --------------------  -----------------------  --------------------
       1          2.9               1861.1                    23                 0.376812              0.369873
       2        179                 1861.1                    23                 0.376812              0.360953
       3          5.2               1861.1                    23                 0.376812              0.341805
       4         37.9               1861.1                    23                 0.376812              0.321247
       5        247.15              1861.1                    23                 0.376812              0.278689
       6         45.1               1861.1                    51                 0.344215              0.30803
       7         12.25              1861.1                    51                 0.344215              0.309487
       8         22.6               1861.1                    51                 0.344215              0.308861
       9         72.9               1861.1                    51                 0.344215              0.304771
      10          3.7               1861.1                    51                 0.344215              0.310005
      11         14.7               1861.1                    86                 0.330825              0.3089
      12         40                 1861.1                    86                 0.330825              0.308363
      13        329.8               1861.1                    86                 0.330825              0.293156
      14        401.7               1861.1                    86                 0.330825              0.277601
      15         71.9               1861.1                    86                 0.330825              0.307075
      16        111.65              1861.1                    86                 0.330825              0.305988
      17         79.9               1828.85                   22                 0.38887               0.345275
      18          2.65              1828.85                   22                 0.38887               0.405101
      19        113.15              1828.85                   22                 0.38887               0.306373
      20          1.05              1828.85                   22                 0.38887               0.406284
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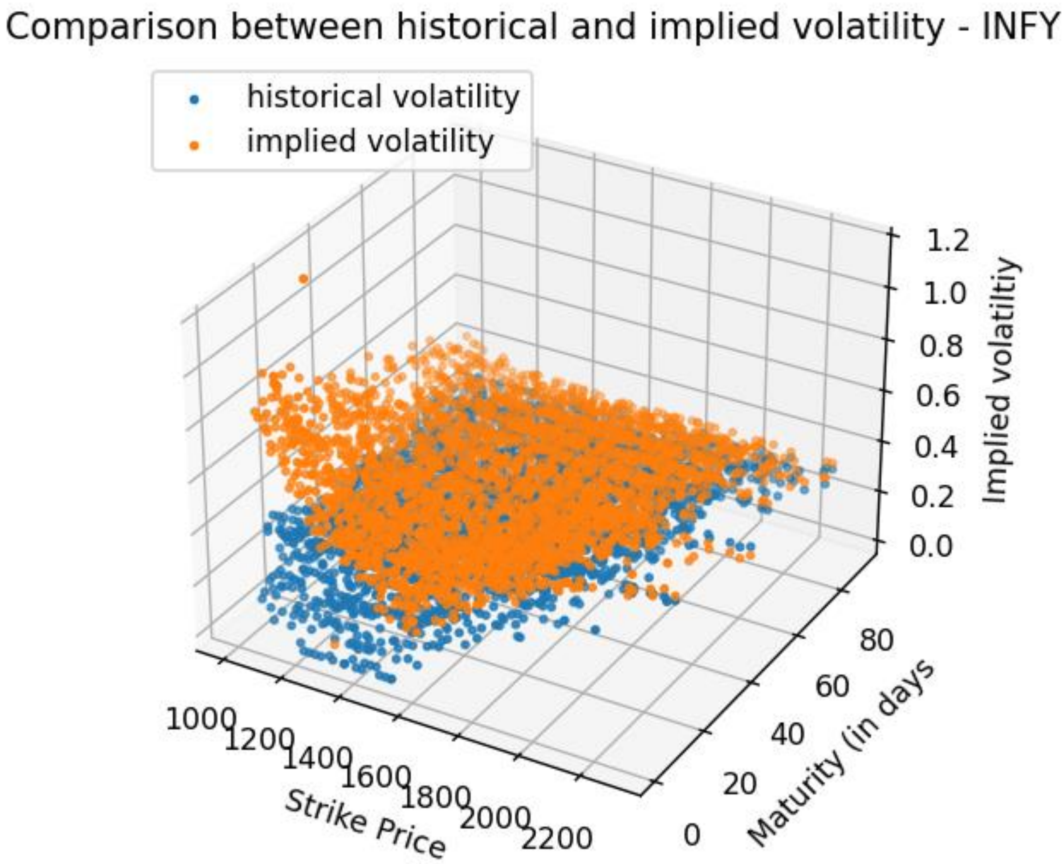

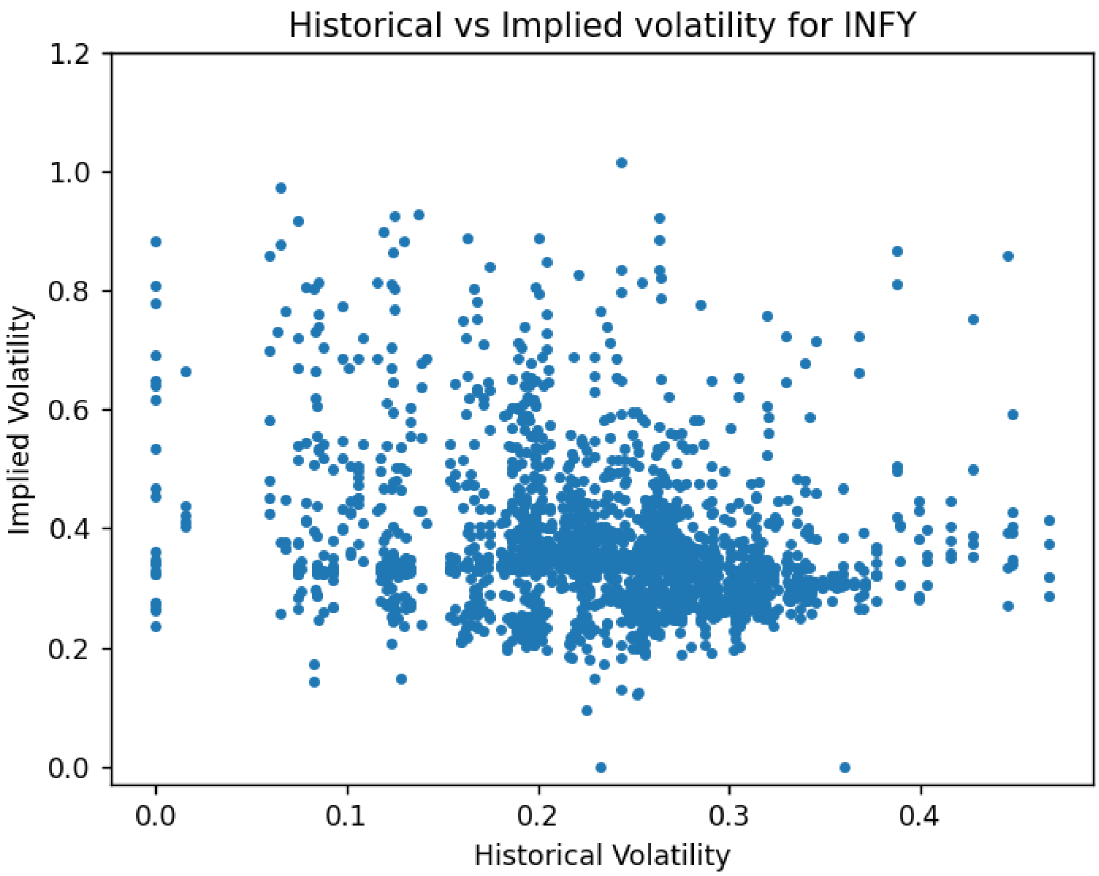

Historical vs Implied volatility for INFY
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Implied Volatility
0.0
0.1
0.2
0.3
0.4
Historical Volatility