MA374-Financial Engineering Laboratory
Assignment 8

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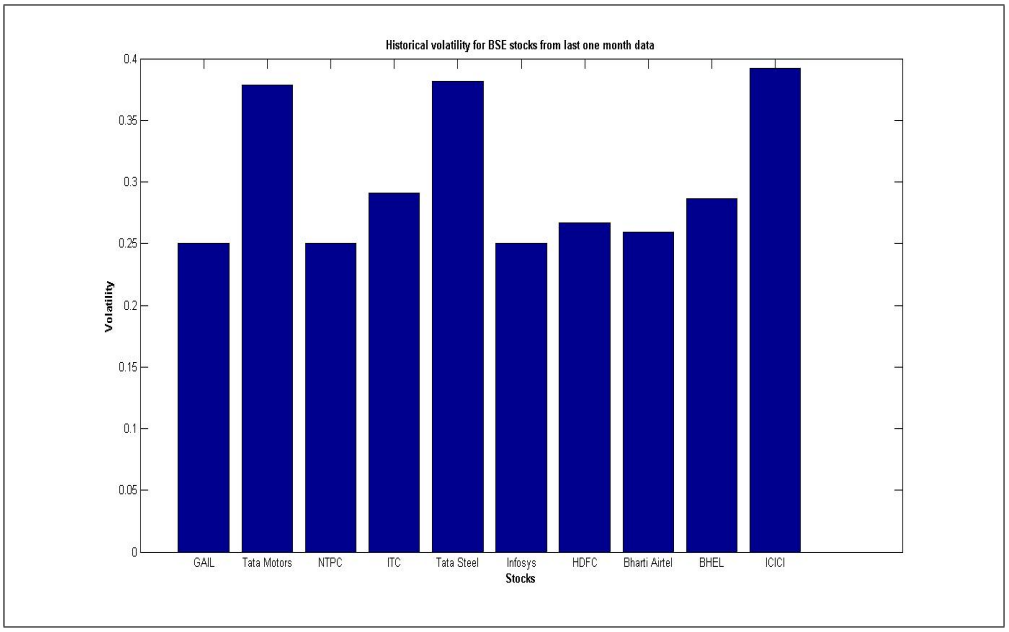
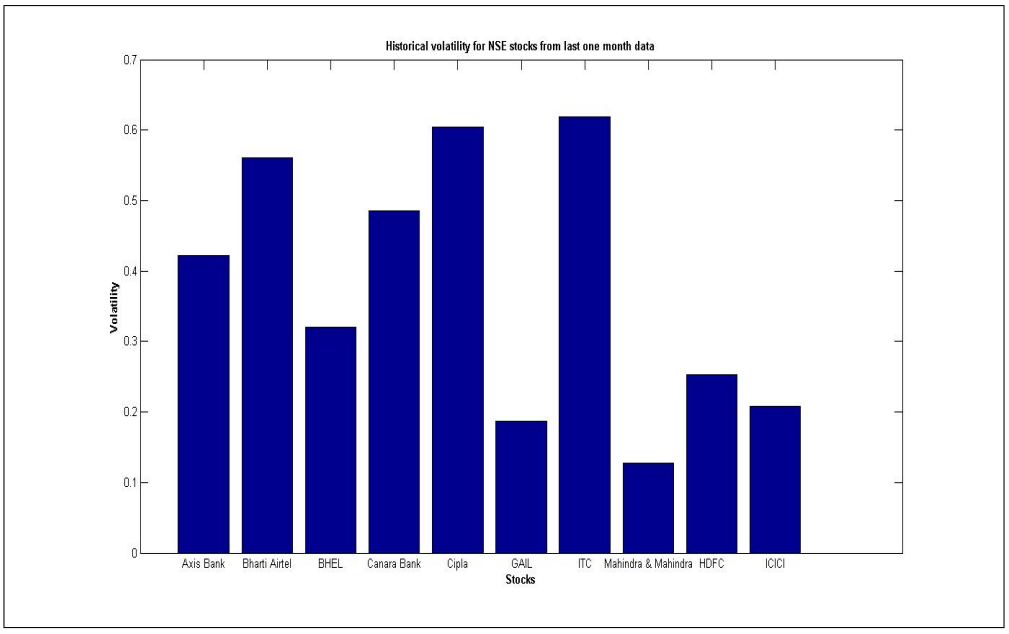
Contents

1 Question 1

1.1 The historical volatility of ten stocks in BSE



1.2 The historical volatility of ten stocks in NSE



1.3 BSM price for a six month European Call (BSE)

A	GAIL	Tata Motors	NTPC	ITC	Tata Steel	Infosys	HDFC	Bharti Airtel	BHEL	ICICI
0.5	139.025	322.3191685	57.0497	72.98481	178.60503	1415.201	383.4919	169.7147401	750.5188	289.5883
0.6	112.5722	261.9374993	46.19473	59.12281	145.17235	1145.927	310.5601	137.4306624	607.9279	235.5391
0.7	86.3107	204.3123607	35.41889	45.49814	113.30003	878.6078	238.4159	105.4429342	467.5919	184.2035
0.8	61.16307	152.3264912	25.10193	32.7382	84.575759	622.6501	169.9702	74.9744069	335.844	138.0945
0.9	39.16771	108.5549054	16.07988	21.79073	60.397388	398.7984	110.6398	48.46694951	222.6119	99.3178
1	22.40341	74.1875041	9.203216	13.38288	41.398659	228.1806	65.29906	28.23486863	135.7372	68.76417
1.1	11.45674	48.86483948	4.710978	7.617421	27.372416	116.7465	35.04406	14.85512932	76.45714	46.05643
1.2	5.288312	31.19382182	2.177424	4.052106	17.55434	53.92576	17.25849	7.124784218	40.12431	29.99676
1.3	2.233105	19.40439766	0.920973	2.034289	10.977639	22.79055	7.891653	3.15402228	19.81801	19.09303
1.4	0.874907	11.82014604	0.361517	0.973177	6.7262497	8.937868	3.390907	1.305358199	9.305418	11.92971
1.5	0.322252	7.080980069	0.13344	0.447537	4.0550088	3.295669	1.384378	0.511139334	4.191937	7.345433

1.4 BSM price for a six month European Put (BSE)

A	GAIL	Tata Motors	NTPC	ITC	Tata Steel	Infosys	HDFC	Bharti Airtel	BHEL	ICICI
0.5	0.000179	0.1309876	7.51E-05	0.001257	0.0784031	0.001842	0.001634	0.000444319	0.010136	0.164536
0.6	0.012437	1.08168222	0.005182	0.032544	0.6303956	0.127592	0.071737	0.023507418	0.287495	1.210603
0.7	0.215945	4.7889074	0.089424	0.301166	2.7427514	2.20852	0.929507	0.342920099	2.819829	4.970316
0.8	1.533342	14.1354018	0.632538	1.434516	8.0031497	15.65097	5.485726	2.18153359	13.9402	13.95652
0.9	6.003025	31.6961798	2.470566	4.380341	17.809453	61.19934	19.15731	7.98121703	43.57634	30.27511
1	15.70376	58.6611423	6.453975	9.865781	32.795398	159.9816	46.81853	20.05627699	99.56995	54.81674
1.1	31.22212	94.6708415	12.82181	17.99361	52.753829	317.9477	89.56548	38.98367851	183.1581	87.20426
1.2	51.51873	138.332188	21.14833	28.32158	76.920427	524.527	144.7819	63.56047425	289.6936	126.2398
1.3	74.92855	187.875127	30.75196	40.19706	104.3284	762.7919	208.417	91.89685315	412.2556	170.4314
1.4	100.0354	241.623239	41.05258	53.02923	134.06168	1018.339	276.9182	122.3553299	544.6112	218.3633
1.5	125.9478	298.216437	51.68458	66.39688	165.37512	1282.097	347.9136	153.8682519	682.366	268.8743

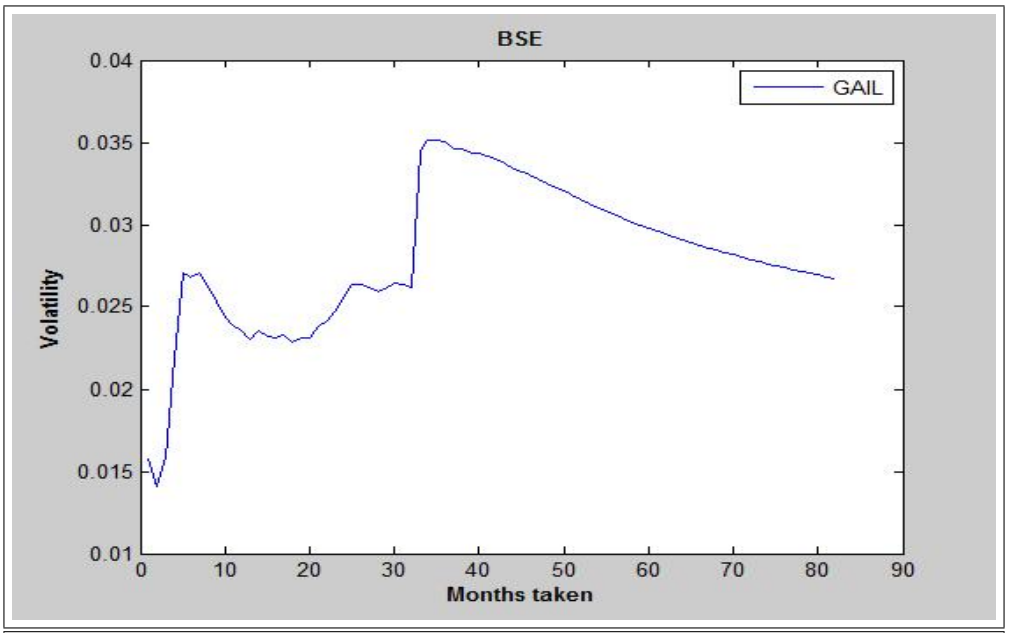
1.5 BSM price for a six month European Call (NSE)

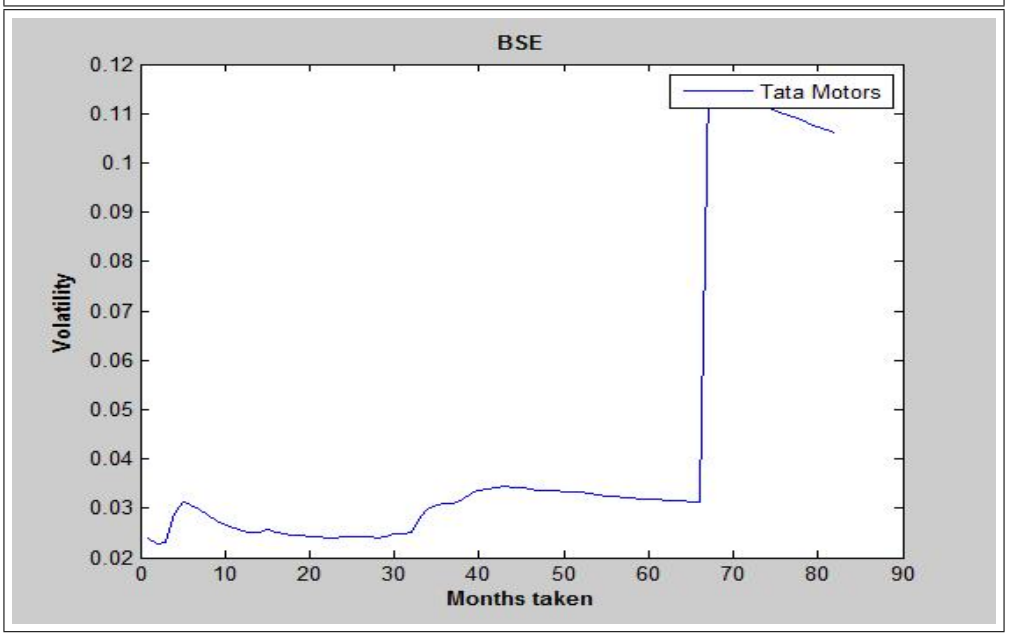
A	Axis Bank	Bharti Airtel	BHEL	Canara Bank	Cipla	GAIL	ITC	Mahindra & Mahindra	HDFC	ICICI
0.5	178.72	108.5840078	94.4004	138.6805107	141.0955	98.47272	53.89045	36.0690911	78.97812	303.1802
0.6	145.6861	89.83613674	76.52072	113.7273438	117.3954	79.72737	44.92522	29.20290932	63.95182	245.4684
0.7	114.6291	72.8397255	59.10534	90.70793725	96.07545	60.99358	36.87841	22.33673958	49.04365	187.8602
0.8	86.96687	58.02168985	43.02429	70.46366586	77.54111	42.49813	29.8878	15.47536471	34.79348	131.4951
0.9	63.74073	45.53902218	29.34913	53.46613315	61.88498	25.52047	23.97694	8.798156494	22.35282	80.73432
1	45.29943	35.31824123	18.77347	39.76576477	48.96147	12.54815	19.08531	3.455906585	12.86662	42.10199
1.1	31.35544	27.13736002	11.31859	29.09343893	38.48368	4.939681	15.10391	0.811282794	6.645122	18.46409
1.2	21.23363	20.70445579	6.479575	21.00649512	30.10477	1.567879	11.90399	0.110231382	3.108619	6.872665
1.3	14.12617	15.71463234	3.550298	15.01161398	23.47325	0.410808	9.356253	0.009097317	1.334545	2.213183
1.4	9.266074	11.88397311	1.876056	10.64324055	18.26461	0.091448	7.341679	0.000491709	0.533003	0.630344
1.5	6.011621	8.965718854	0.962595	7.502008031	14.196	0.017787	5.756456	1.87676E-05	0.200578	0.162182

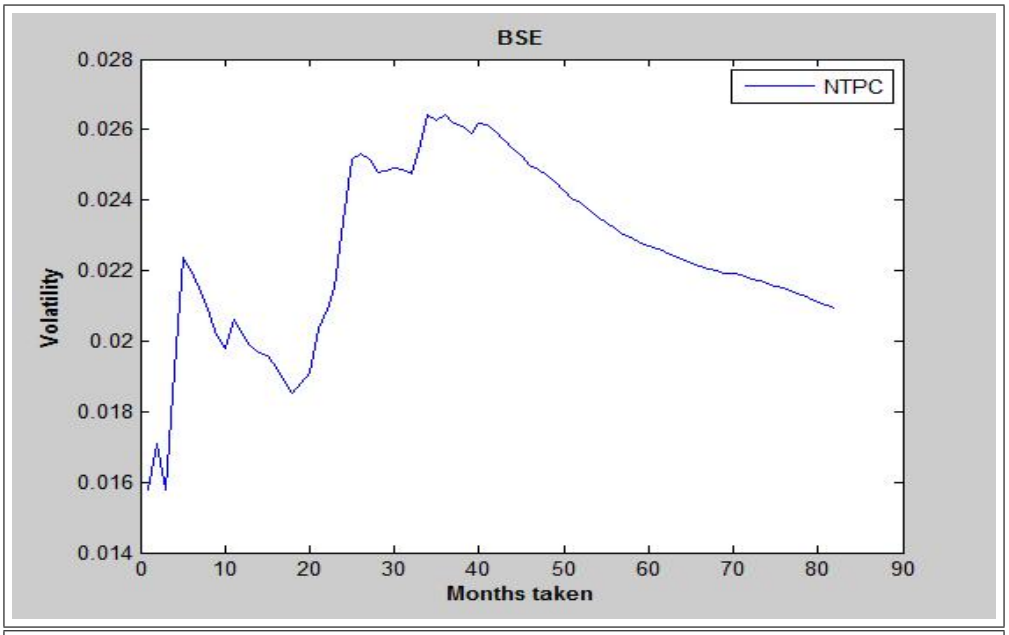
1.6 BSM price for a six month European Put (NSE)

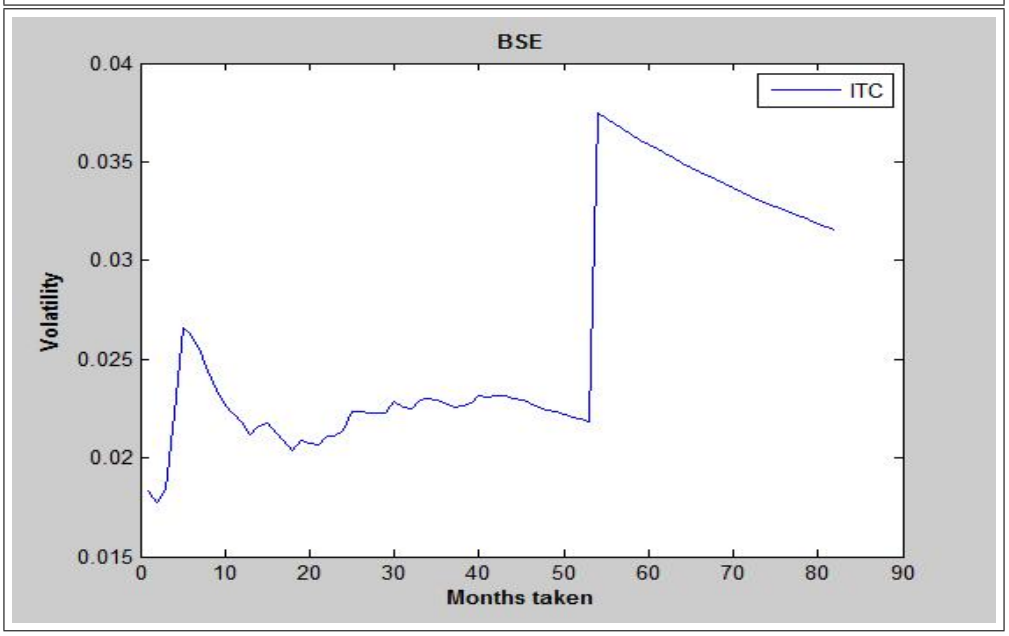
A	Axis Bank	Bharti Airtel	BHEL	Canara Bank	Cipla	GAIL	ITC	Mahindra & Mahindra	HDFC	ICICI
0.5	0.1933386	0.796857408	0.005947	0.424200562	1.532677	8.35E-08	0.657799	3.49464E-16	0.00013	6.24E-06
0.6	1.1441735	2.567556319	0.095384	1.789771646	4.400097	0.000108	1.826039	9.44053E-10	0.008232	0.002222
0.7	4.0717722	6.089715006	0.649113	5.08910308	9.647548	0.011775	3.912699	1.20416E-05	0.134465	0.10794
0.8	10.394264	11.79024928	2.537166	11.16356967	17.68064	0.261782	7.055563	0.004818958	0.918697	1.456837
0.9	21.152794	19.82615154	6.831122	20.48477493	28.59196	2.029582	11.27817	0.19379252	3.512445	8.41
1	36.696164	30.12394053	14.22457	33.10314454	42.23589	7.802714	16.52001	1.717724391	9.06064	27.49163
1.1	56.736849	42.46162925	24.7388	48.74955667	58.32554	18.9397	22.67208	5.939282381	17.87355	61.56769
1.2	80.599715	56.54729494	37.86889	66.98135083	76.51408	34.31336	29.60563	12.10441275	29.37145	107.6902
1.3	107.47693	72.07604142	52.90873	87.30520767	96.44999	51.90174	37.19136	18.86946047	42.63177	160.7447
1.4	136.60151	88.76395212	69.20359	109.2555722	117.8088	70.32784	45.31026	25.72703664	56.86464	216.8758
1.5	167.33173	106.3642678	86.25924	132.4330777	140.3076	88.99963	53.85851	32.59274548	71.56661	274.1216

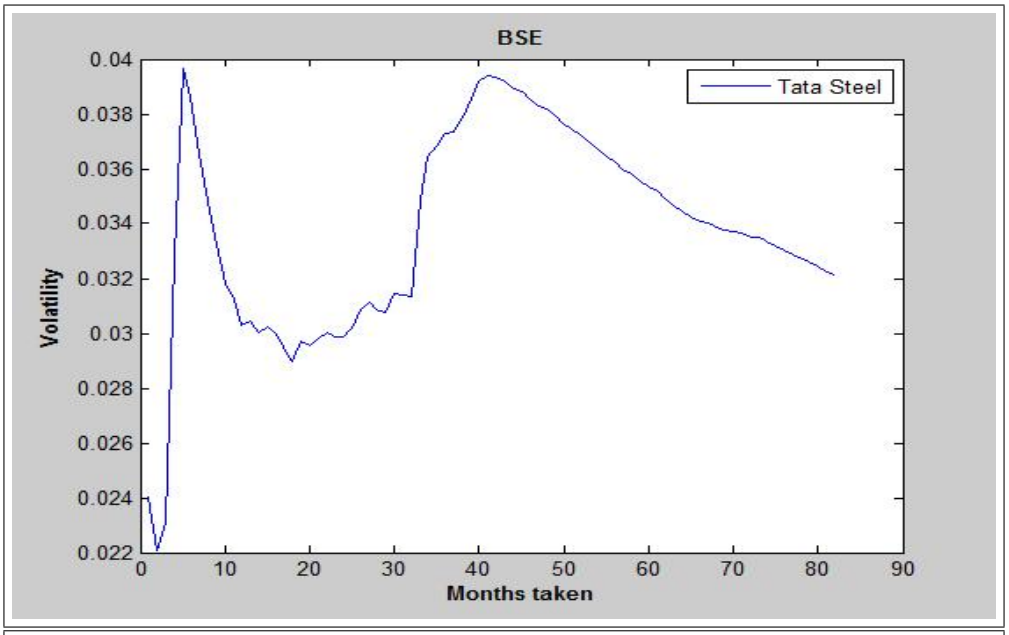
1.7 Volatility vs Time of BSE Stocks

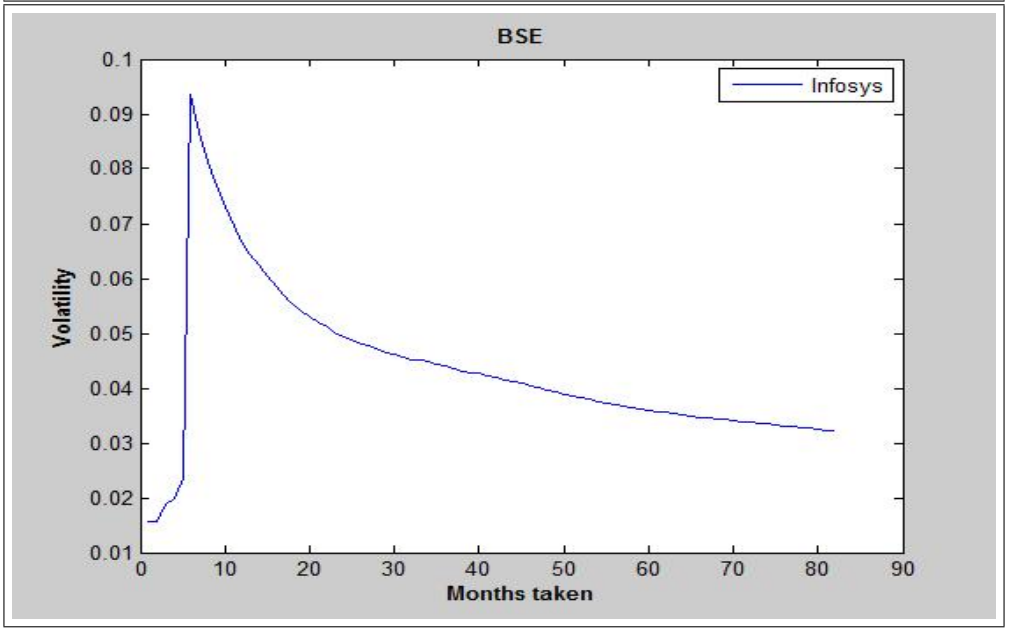


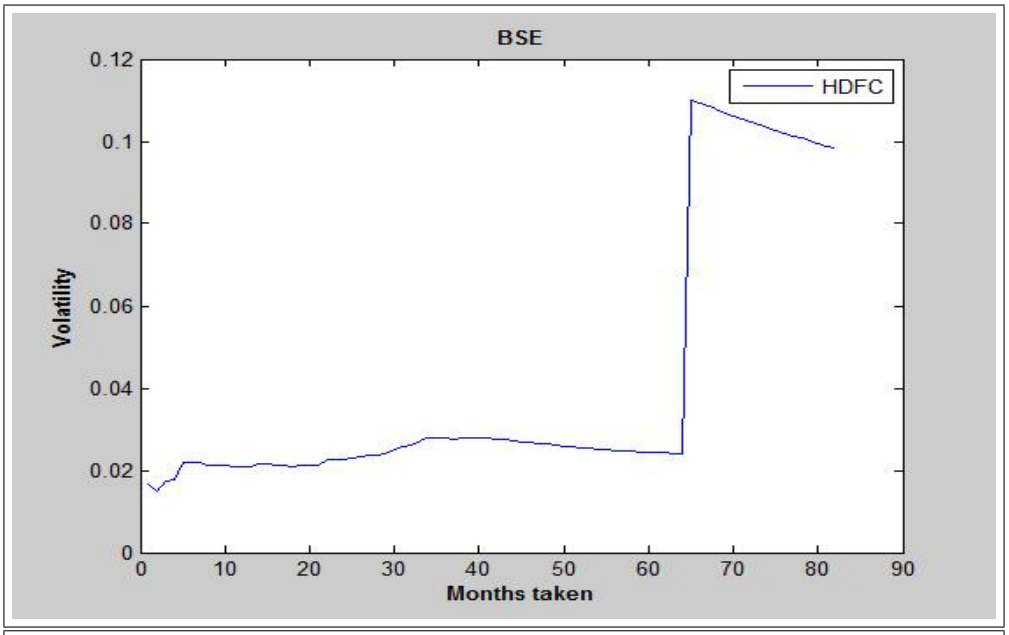


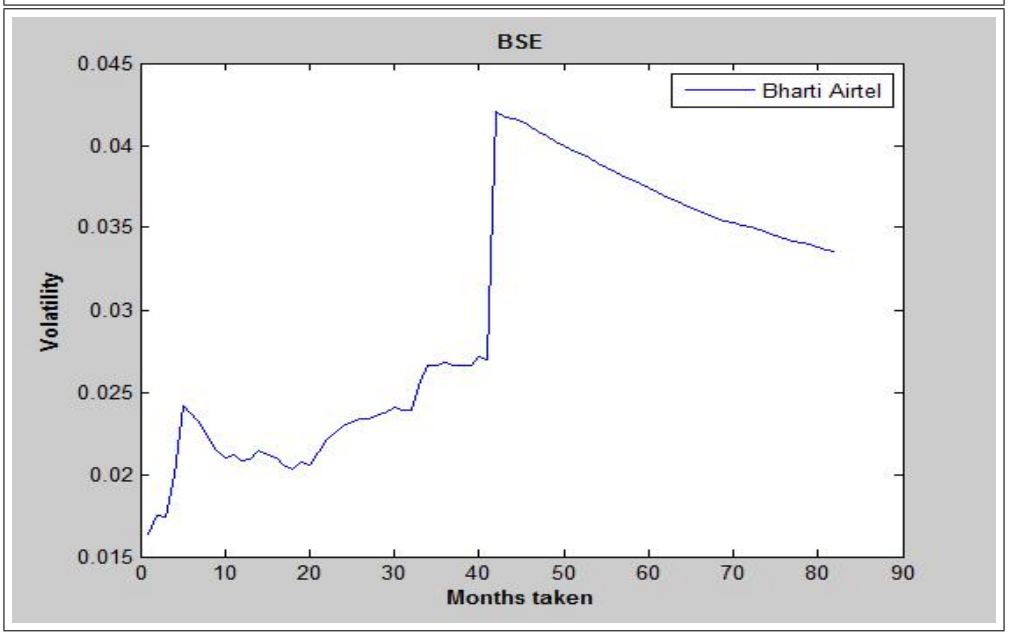

BSE
NTPC
Volatility
Months taken
0.028
0.026
0.024
0.022
0.02
0.018
0.016
0.014
0
10
20
30
40
50
60
70
80
90

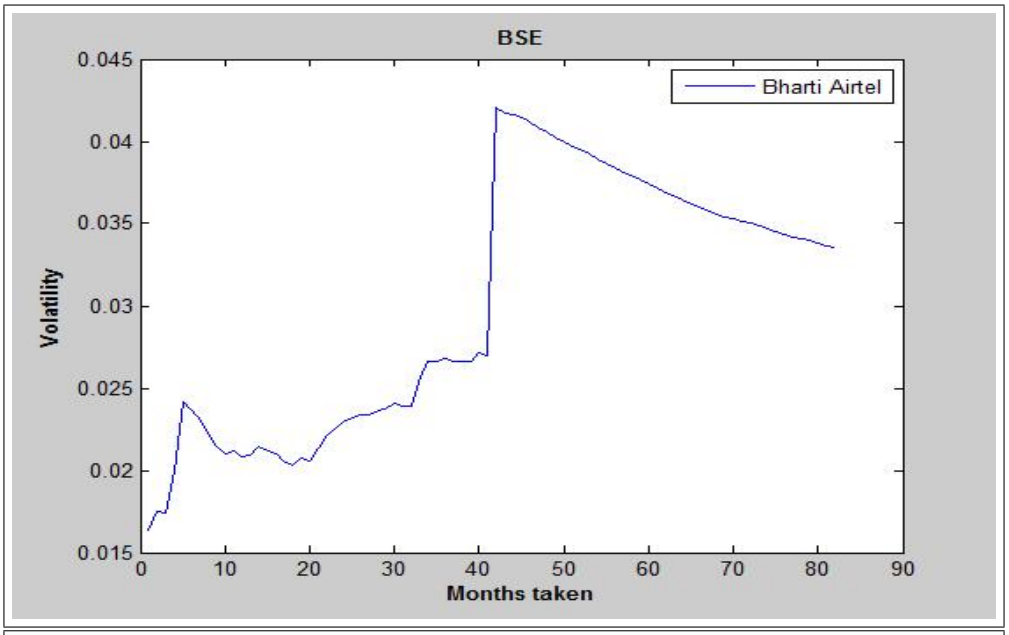

BSE
ITC
Volatility
Months taken
0.04
0.035
0.03
0.025
0.02
0.015
0
10
20
30
40
50
60
70
80
90

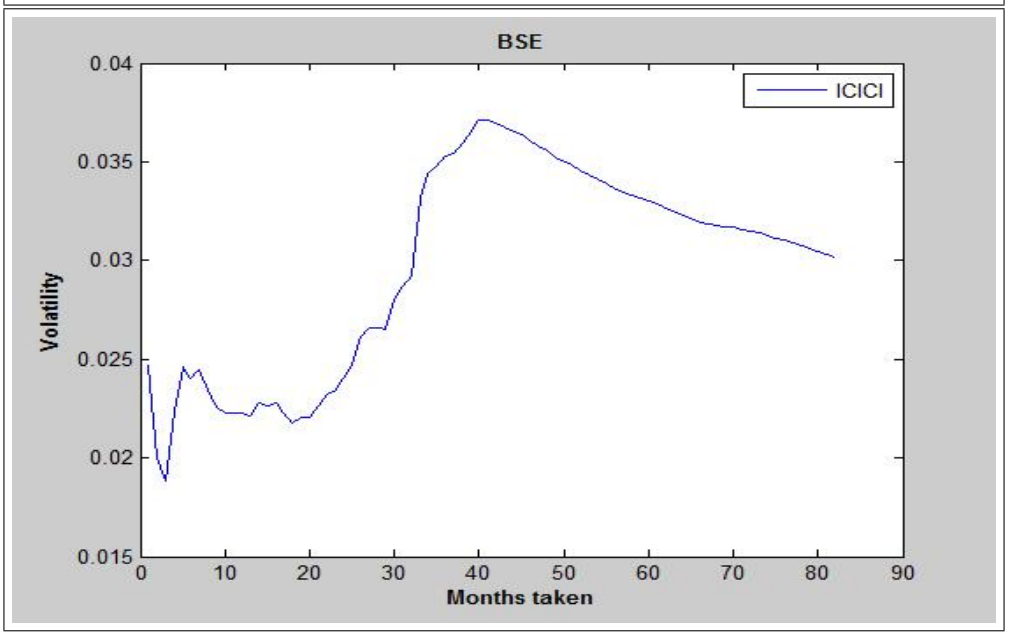

BSE
Tata Steel
Volatility
Months taken
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0
10
20
30
40
50
60
70
80
90


BSE
Infosys
Volatility
Months taken
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
10
20
30
40
50
60
70
80
90

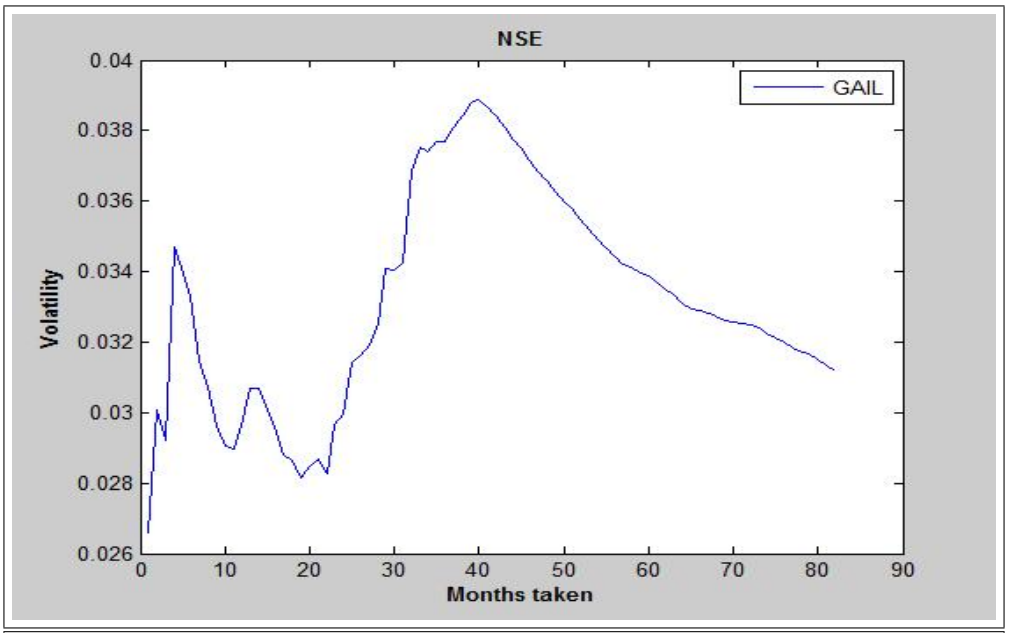

BSE
HDFC
Volatility
Months taken
0.12
0.1
0.08
0.06
0.04
0.02
0
0
10
20
30
40
50
60
70
80
90

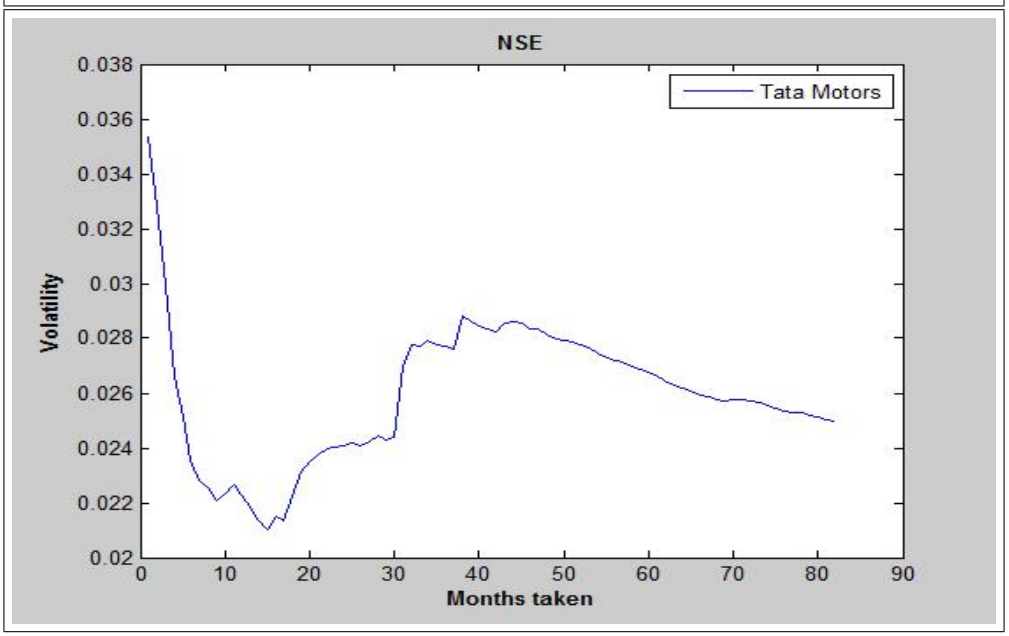

BSE
Bharti Airtel
Volatility
Months taken
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0
10
20
30
40
50
60
70
80
90

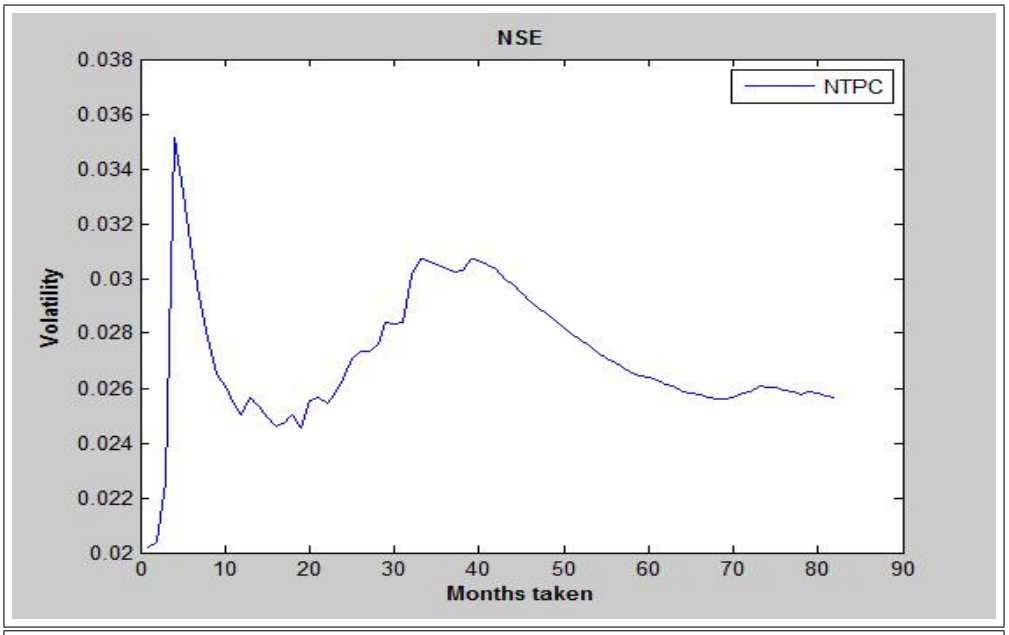

BSE
Bharti Airtel
Volatility
Months taken
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0
10
20
30
40
50
60
70
80
90

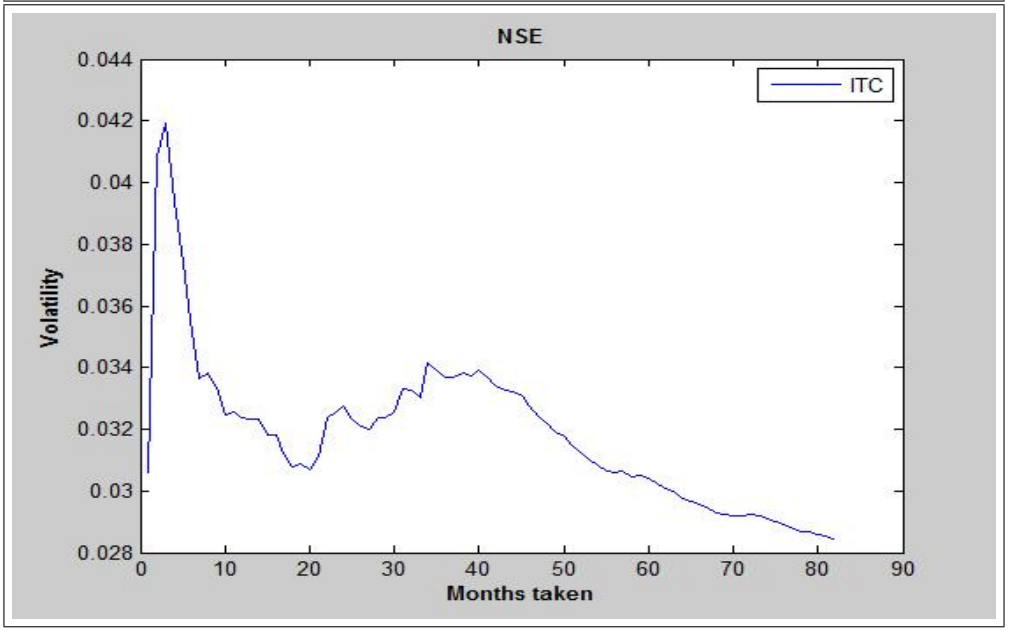

BSE
ICICI
Volatility
Months taken
0.04
0.035
0.03
0.025
0.02
0.015
0
10
20
30
40
50
60
70
80
90

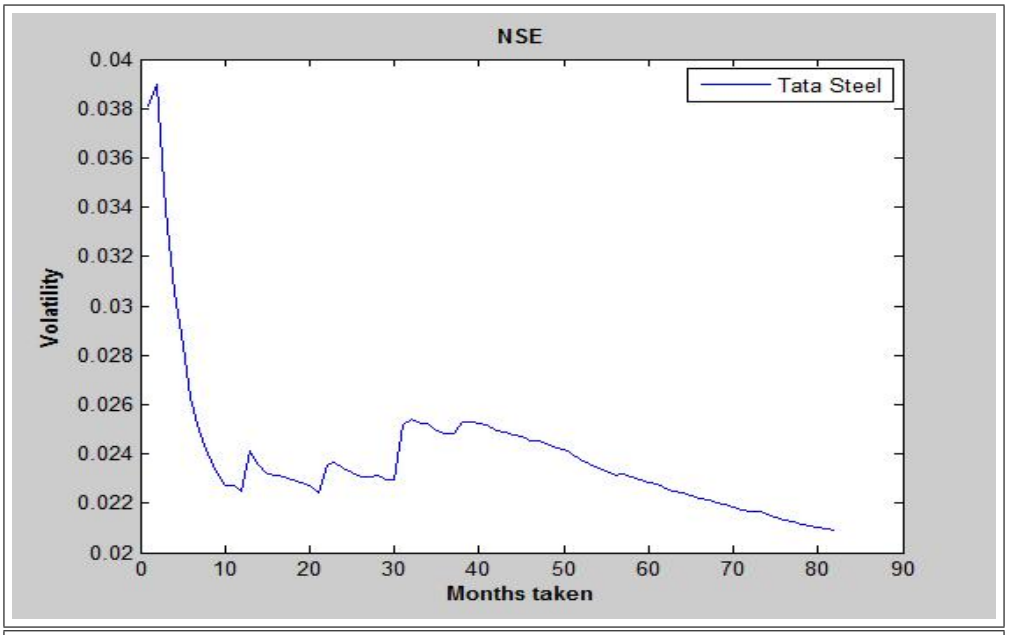
1.8 Volatility vs Time of NSE Stocks

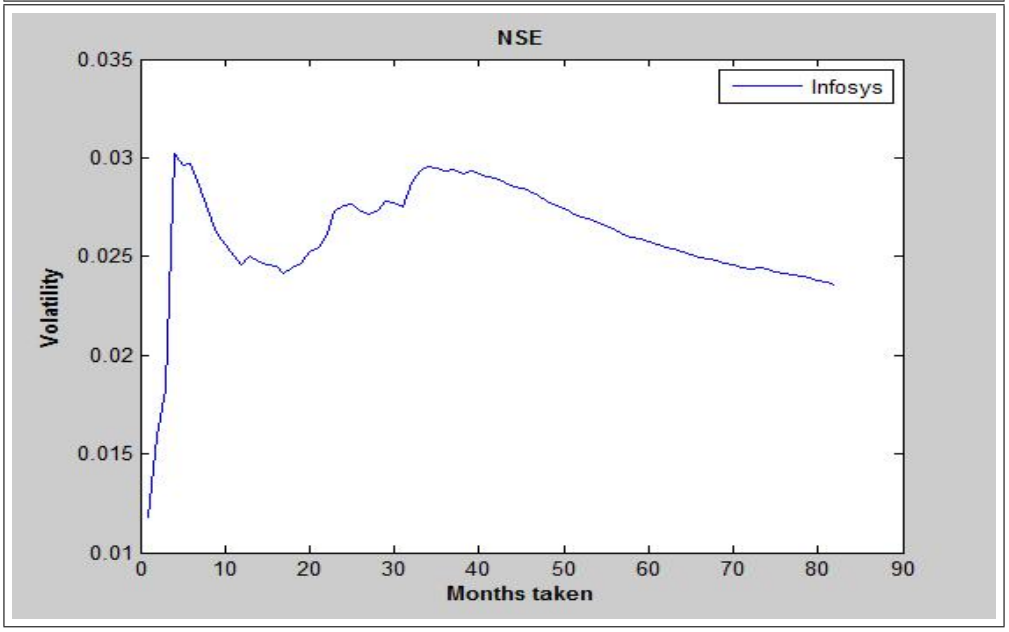


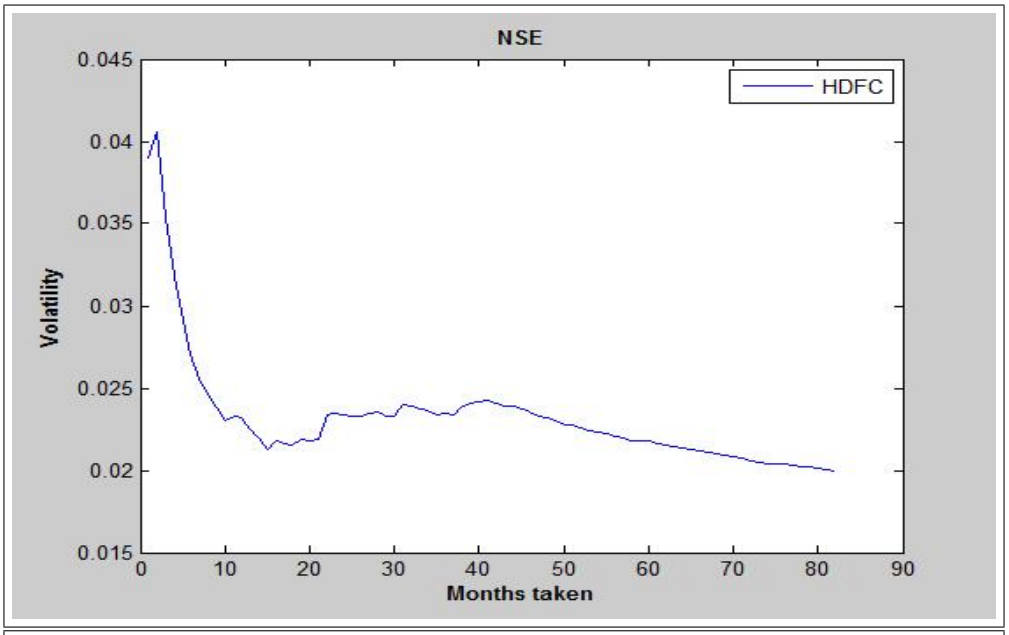


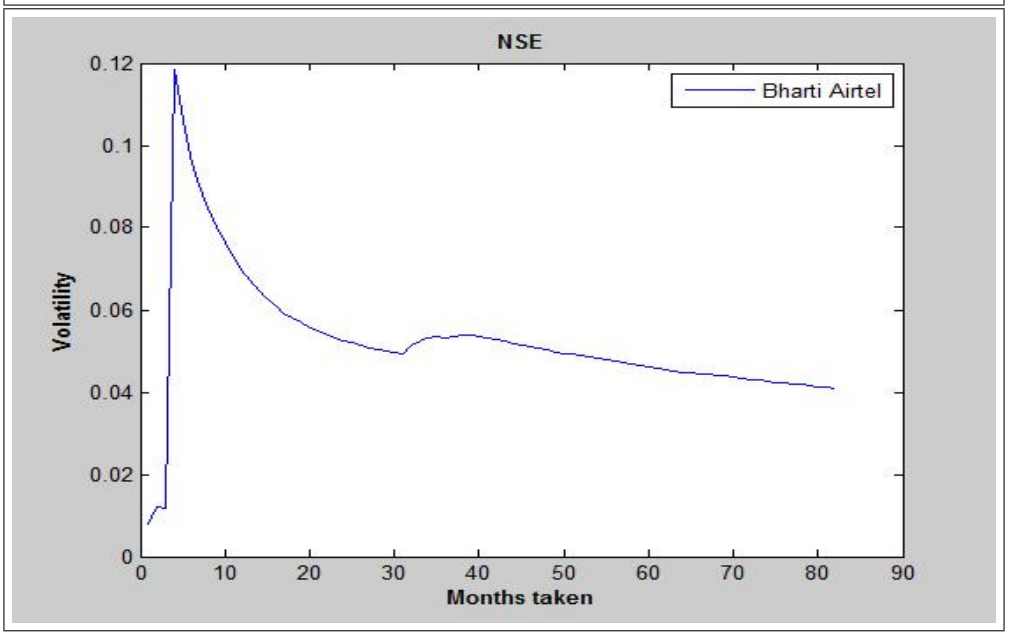

NSE
NTPC
Volatility
Months taken
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0
10
20
30
40
50
60
70
80
90

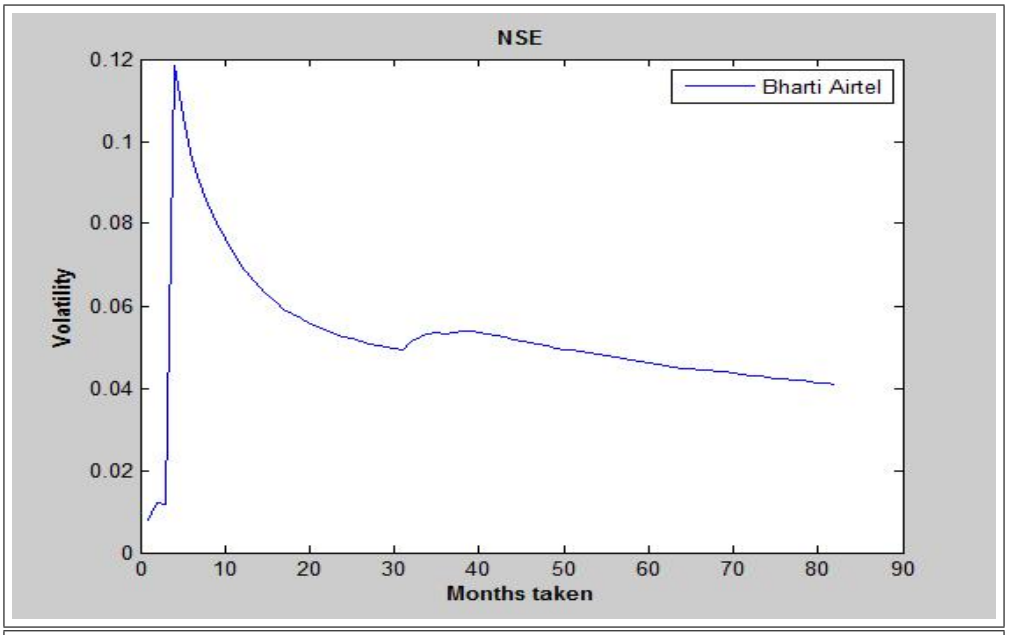

NSE
ITC
Volatility
Months taken
0.044
0.042
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0
10
20
30
40
50
60
70
80
90

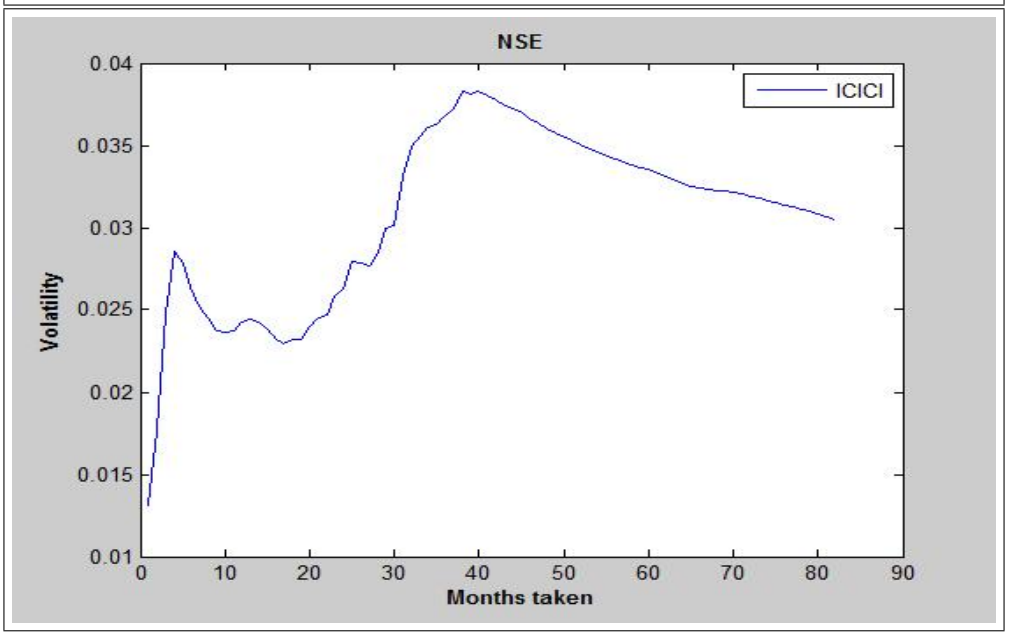

NSE
Tata Steel
Volatility
Months taken
0.04
0.038
0.036
0.034
0.032
0.03
0.028
0.026
0.024
0.022
0.02
0
10
20
30
40
50
60
70
80
90


NSE
Infosys
Volatility
Months taken
0.035
0.03
0.025
0.02
0.015
0.01
0
10
20
30
40
50
60
70
80
90


NSE
HDFC
Volatility
Months taken
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0
10
20
30
40
50
60
70
80
90

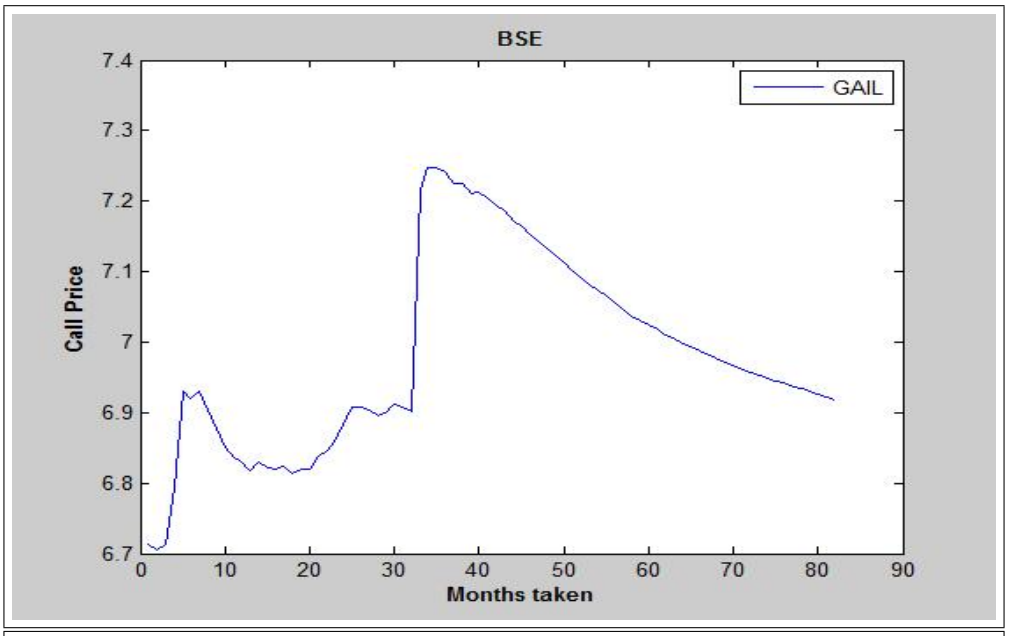

NSE
Bharti Airtel
Volatility
Months taken
0.12
0.1
0.08
0.06
0.04
0.02
0
0
10
20
30
40
50
60
70
80
90

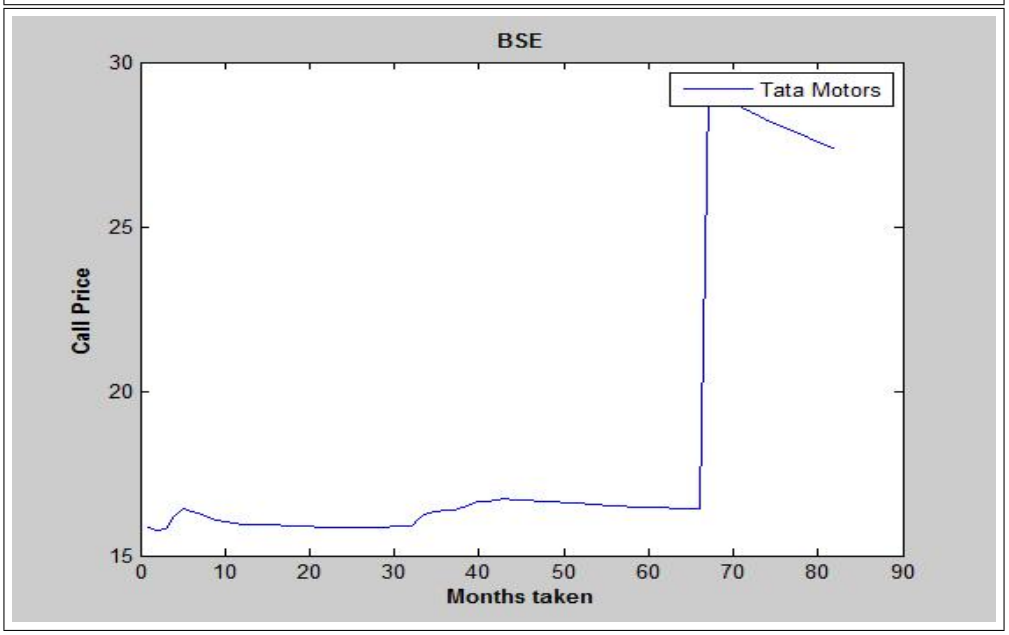

NSE
Bharti Airtel
Volatility
Months taken
0.12
0.1
0.08
0.06
0.04
0.02
0
0
10
20
30
40
50
60
70
80
90

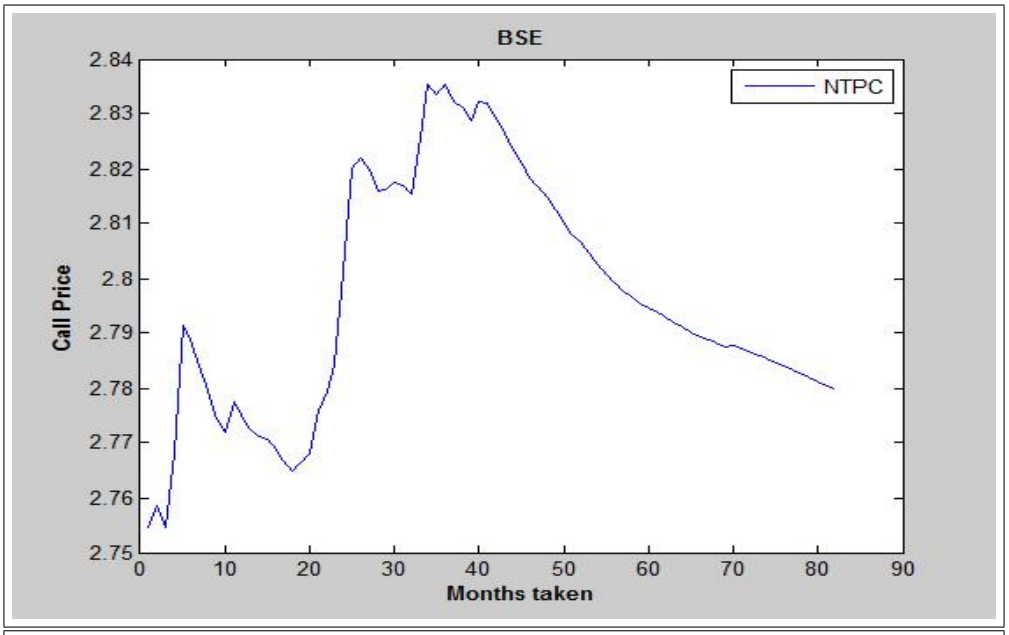

NSE
ICICI
Volatility
Months taken
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0
10
20
30
40
50
60
70
80
90

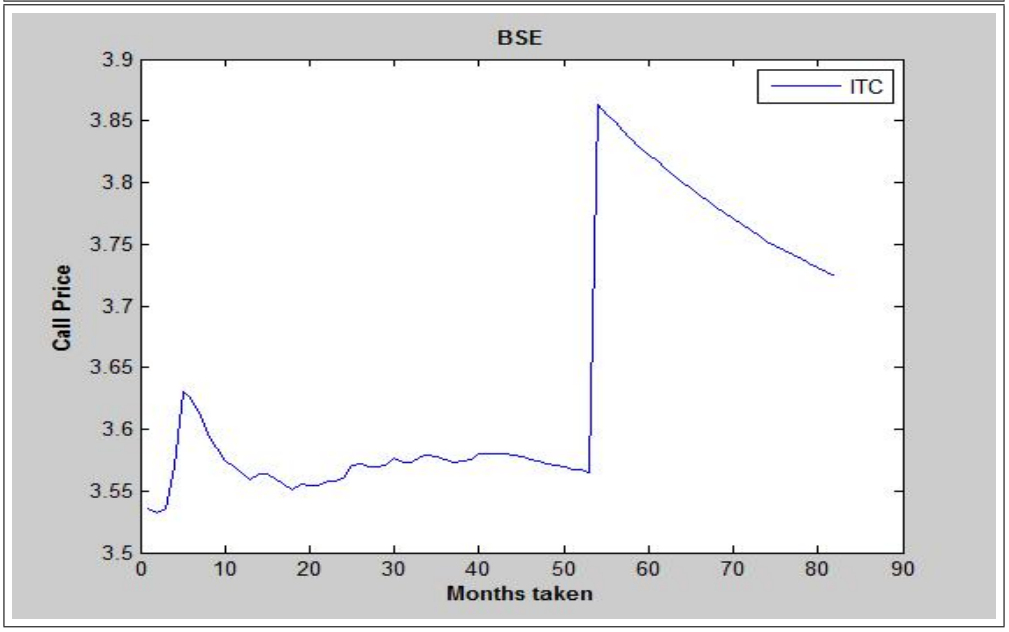
1.9 Option Price vs Time of BSE Stocks

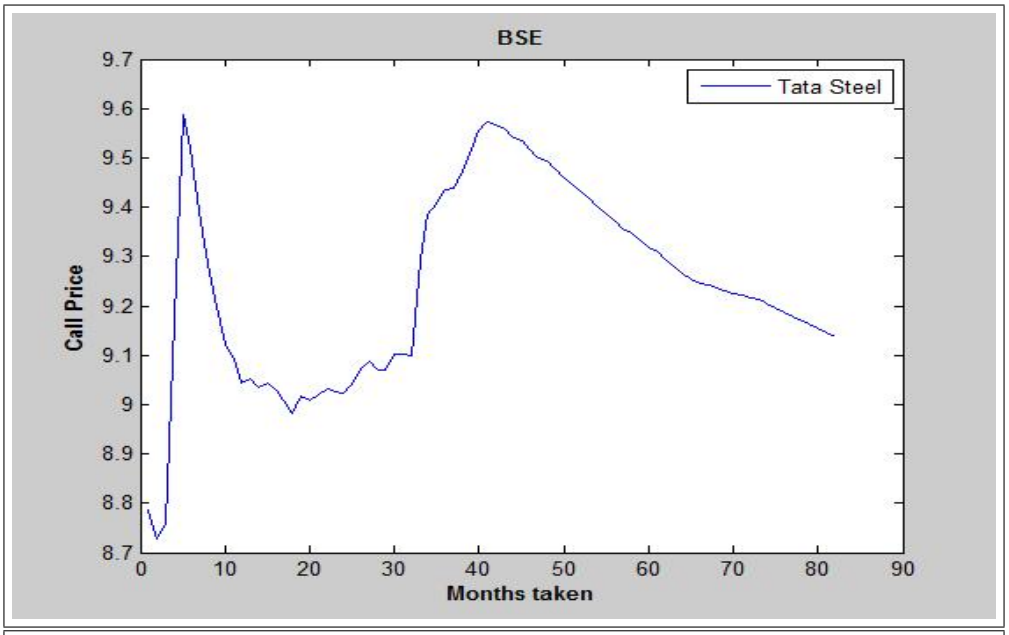
1.9.1 BSE Call

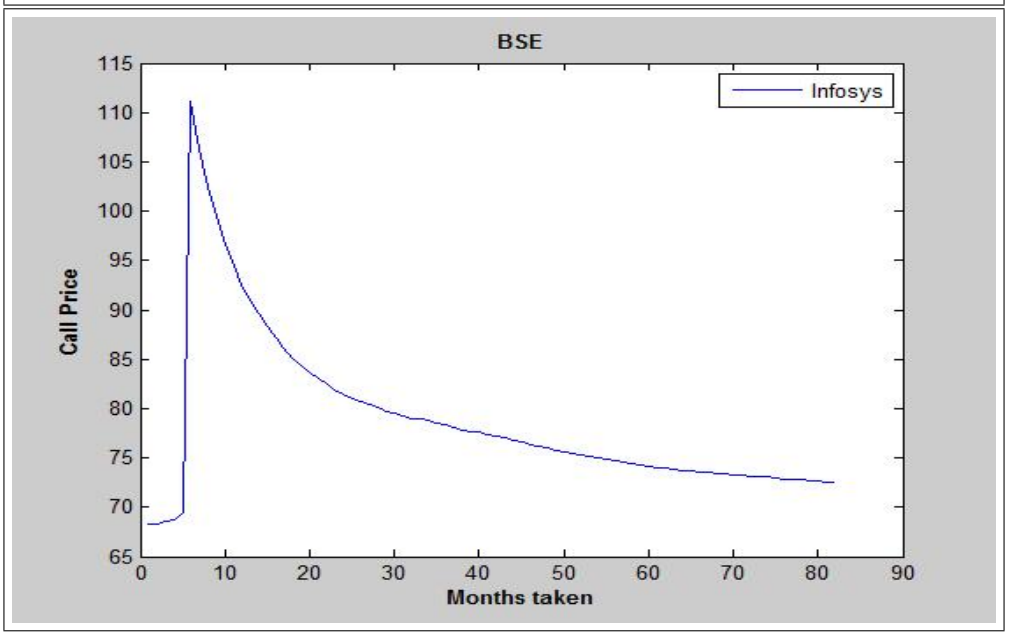


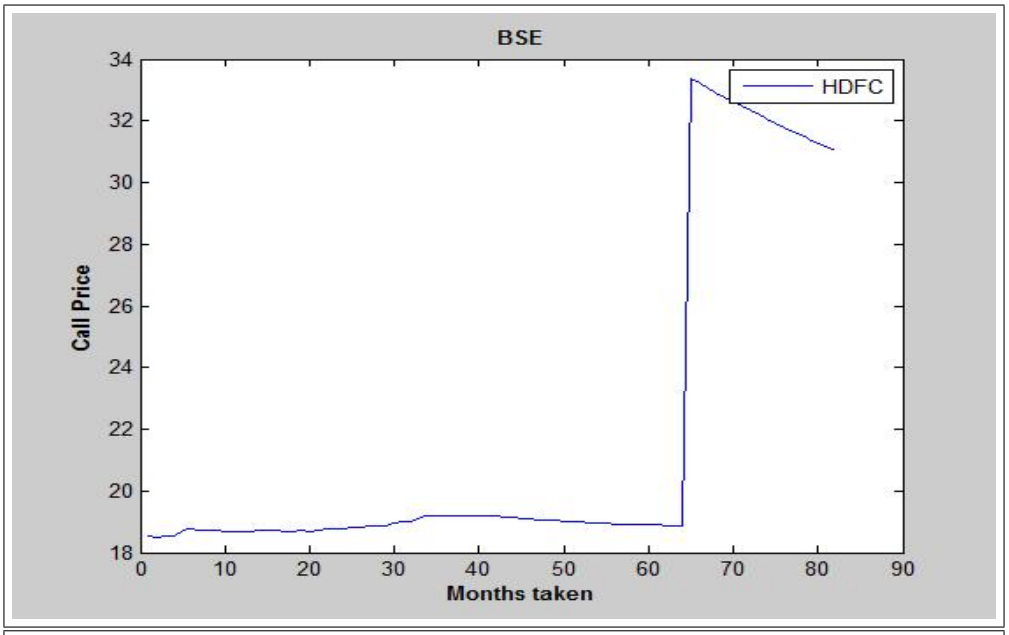


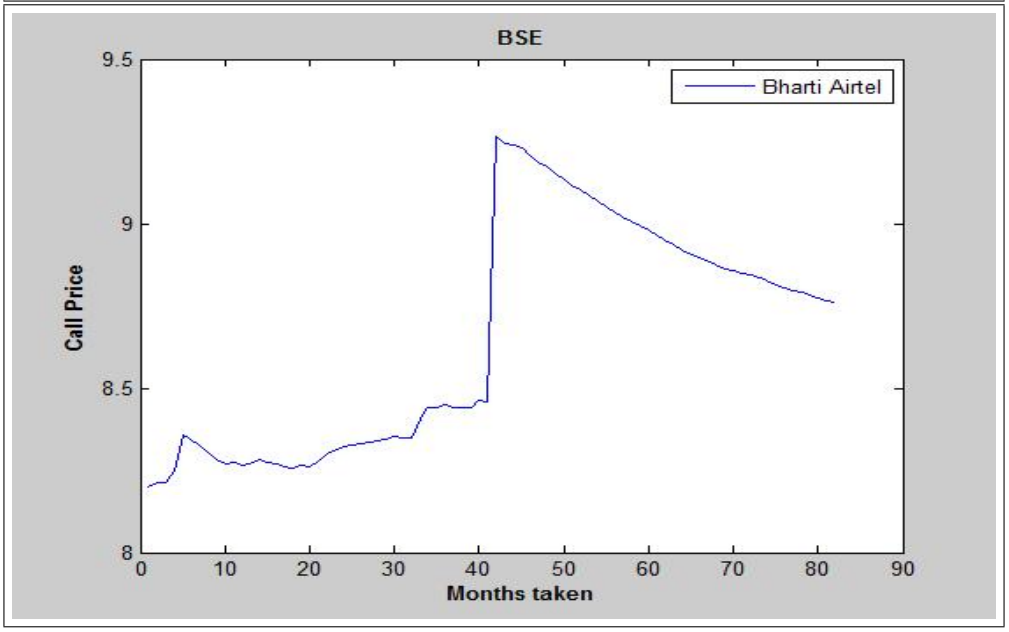

BSE
NTPC
Call Price
Months taken
2.84
2.83
2.82
2.81
2.8
2.79
2.78
2.77
2.76
2.75
0
10
20
30
40
50
60
70
80
90

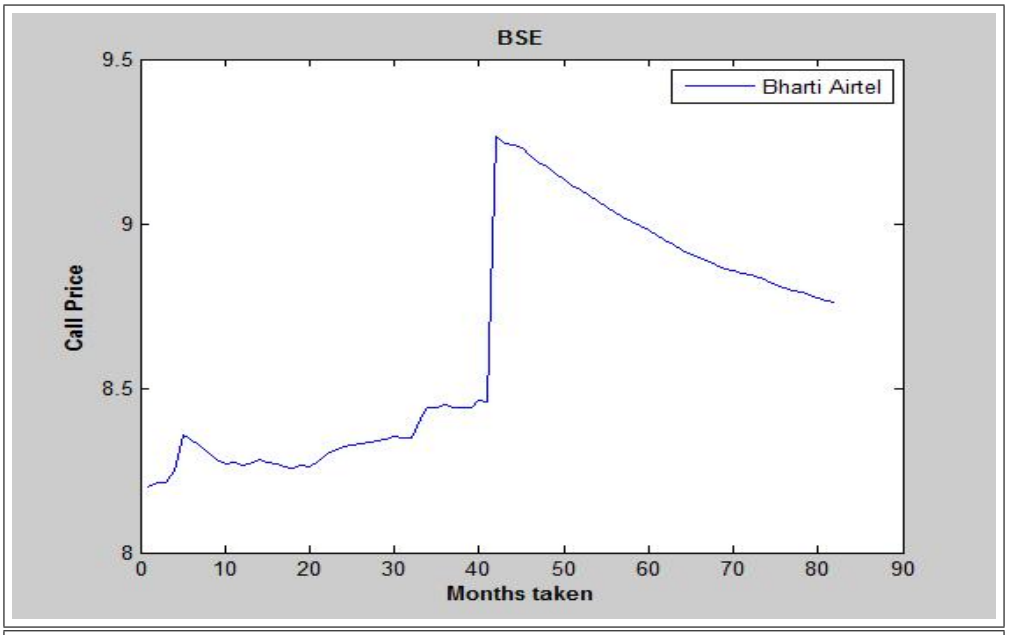

BSE
ITC
Call Price
Months taken
3.9
3.85
3.8
3.75
3.7
3.65
3.6
3.55
3.5
0
10
20
30
40
50
60
70
80
90

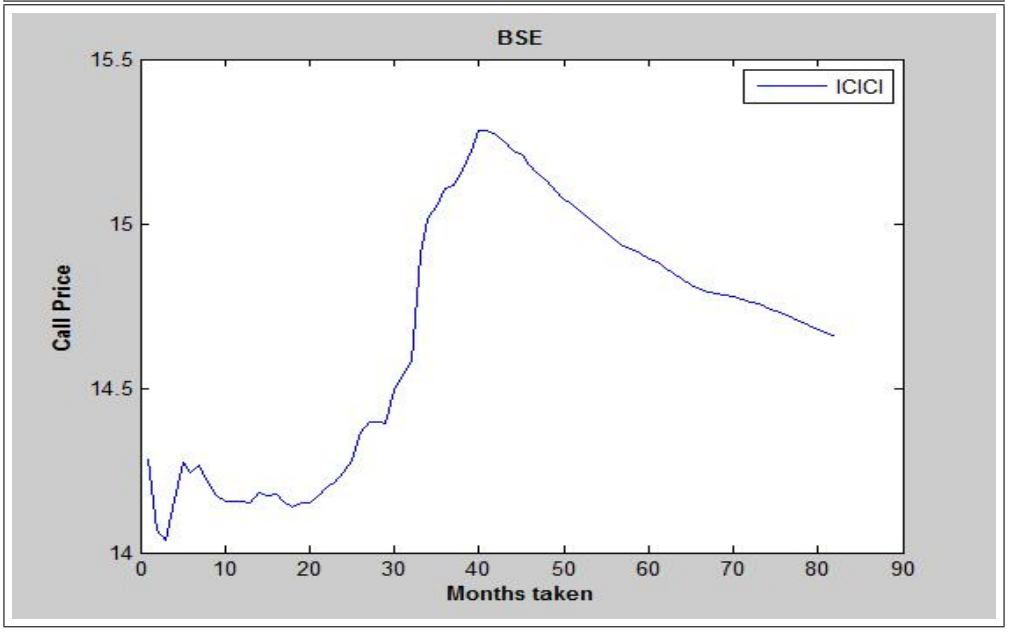

BSE
Tata Steel
Call Price
Months taken
9.7
9.6
9.5
9.4
9.3
9.2
9.1
9
8.9
8.8
8.7
0
10
20
30
40
50
60
70
80
90


BSE
Infosys
Call Price
Months taken
115
110
105
100
95
90
85
80
75
70
65
0
10
20
30
40
50
60
70
80
90

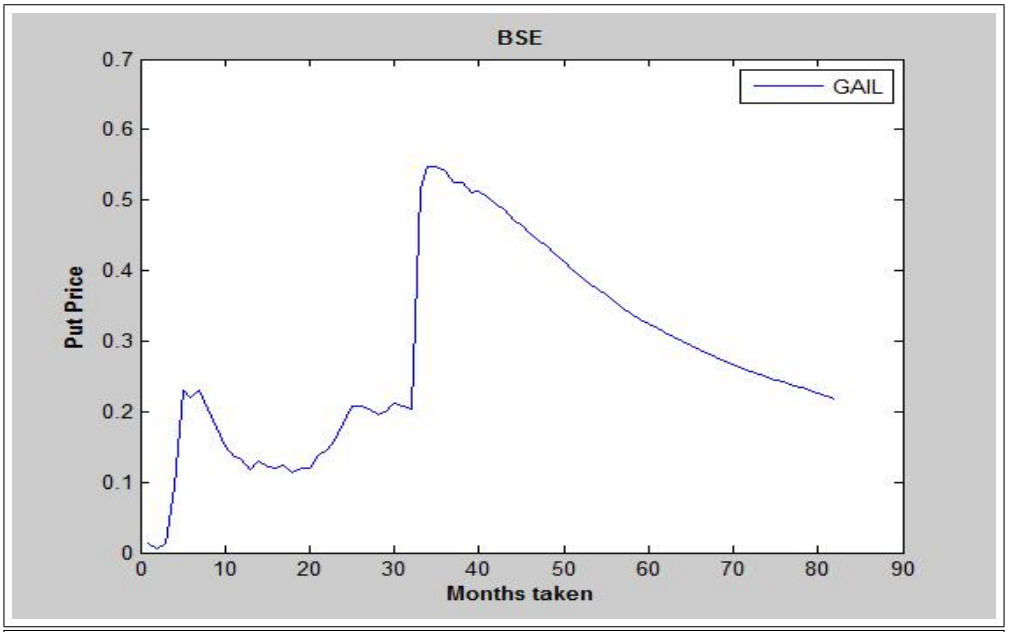

BSE
HDFC
Call Price
Months taken
34
32
30
28
26
24
22
20
18
0
10
20
30
40
50
60
70
80
90

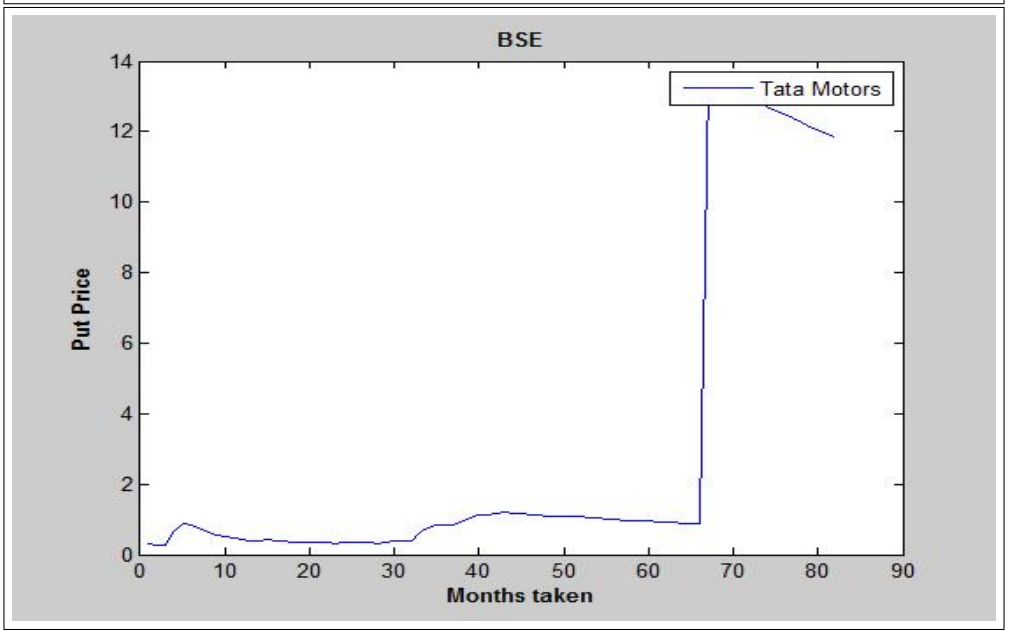

BSE
Bharti Airtel
Call Price
Months taken
9.5
9
8.5
8
0
10
20
30
40
50
60
70
80
90

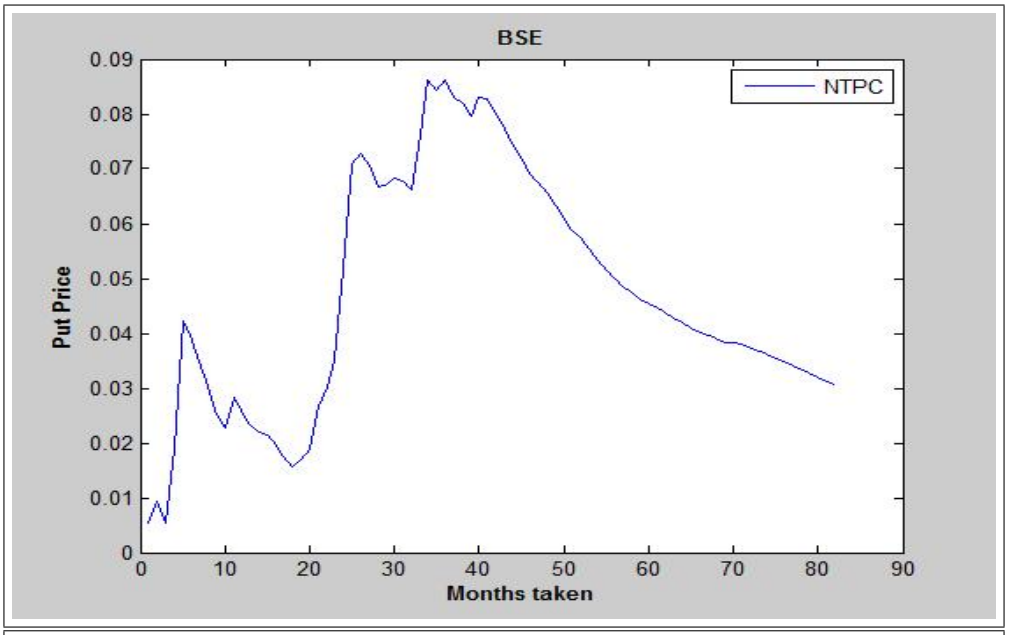

BSE
Bharti Airtel
Call Price
Months taken
9.5
9
8.5
8
0
10
20
30
40
50
60
70
80
90

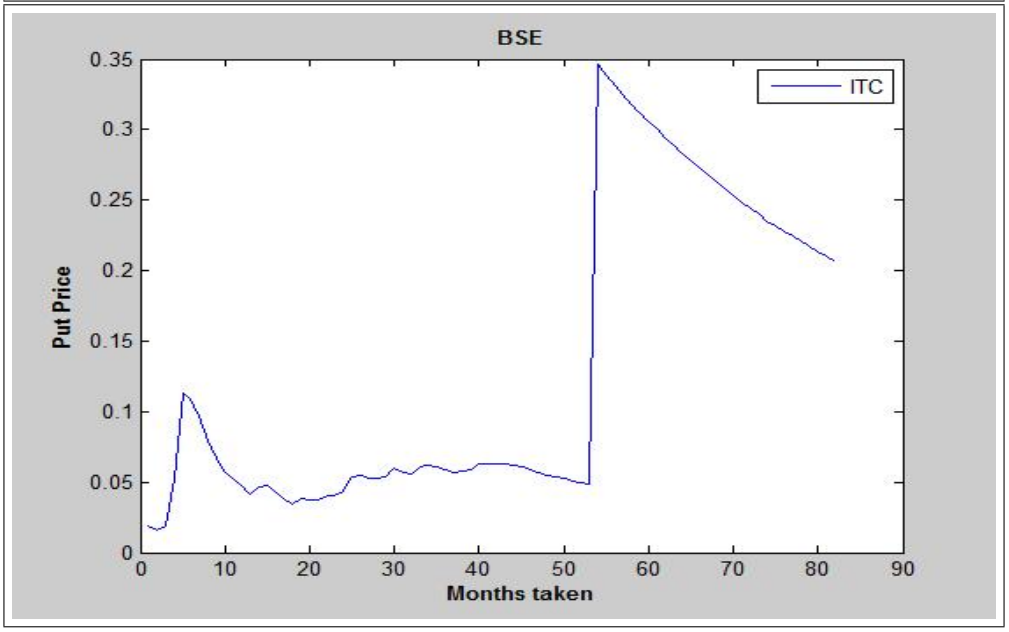

BSE
ICICI
Call Price
Months taken
15.5
15
14.5
14
0
10
20
30
40
50
60
70
80
90

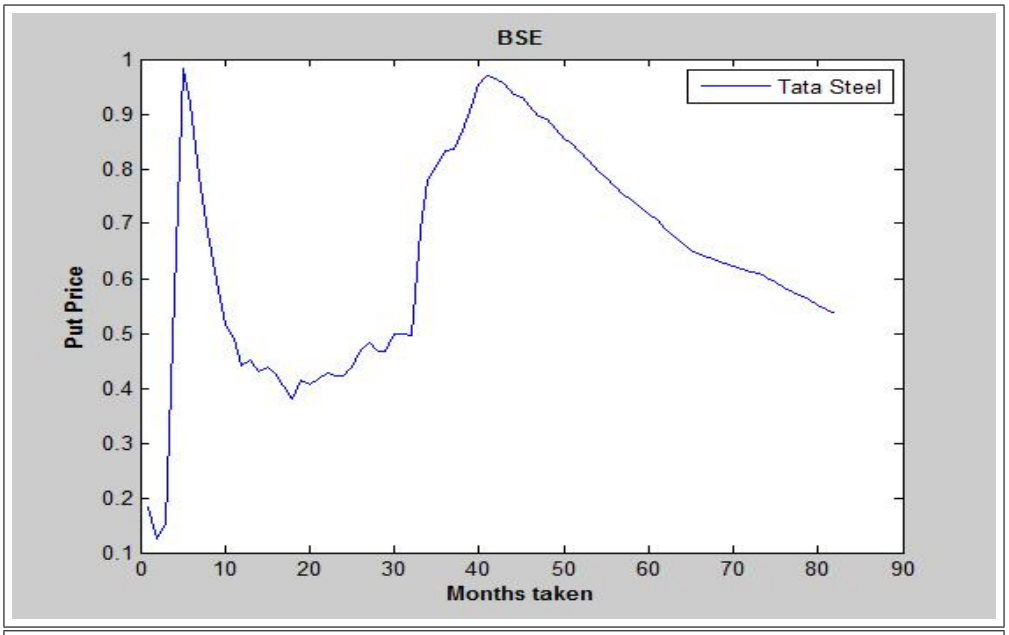
1.9.2 BSE Put

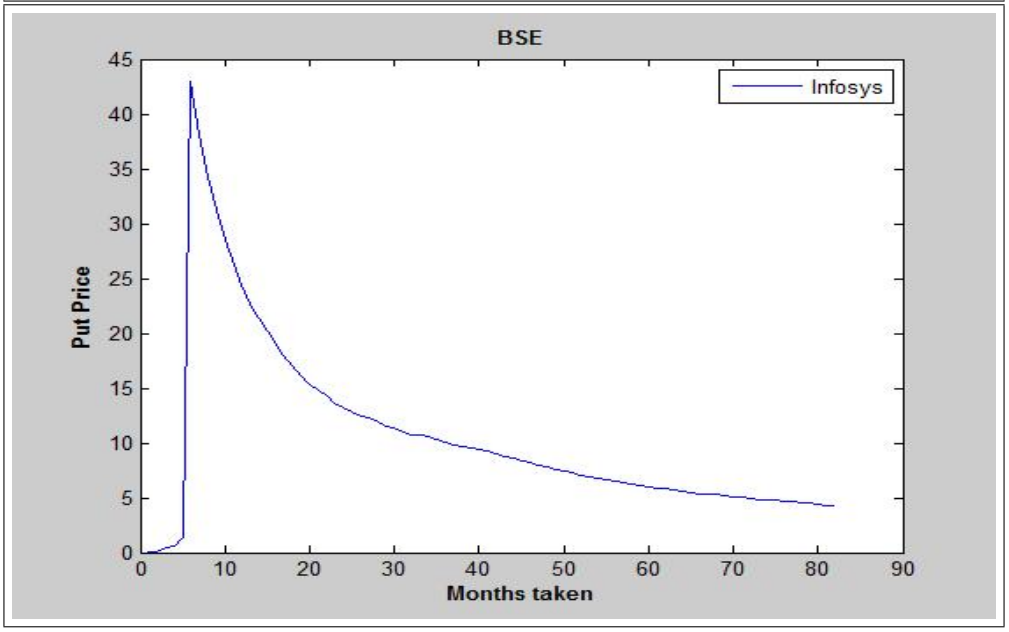

BSE
GAIL
Put Price
Months taken
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
10
20
30
40
50
60
70
80
90

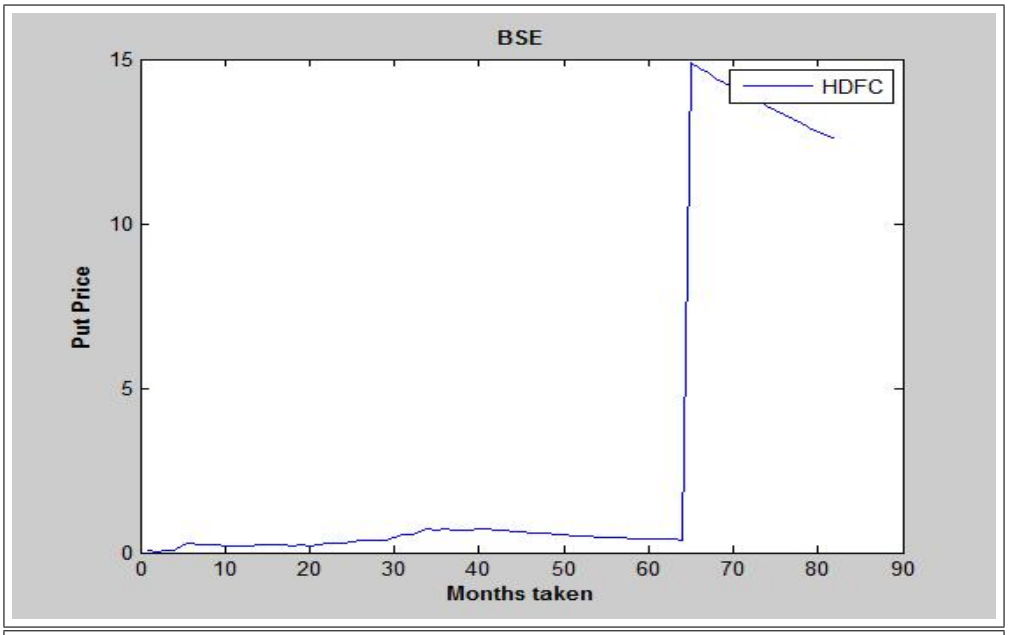

BSE
Tata Motors
Put Price
Months taken
0
2
4
6
8
10
12
14
0
10
20
30
40
50
60
70
80
90

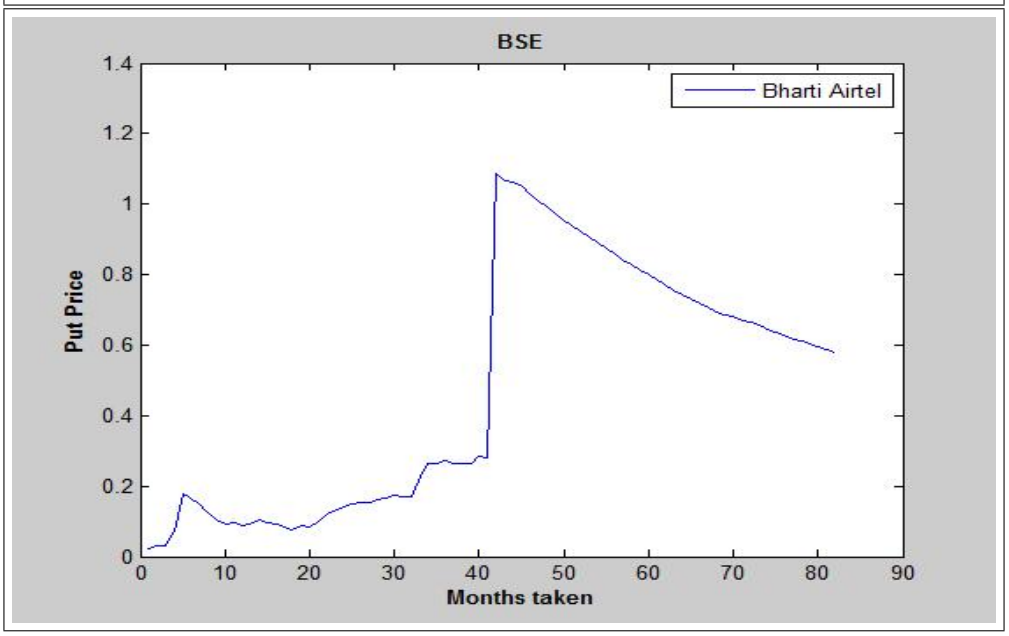

BSE
NTPC
Put Price
Months taken
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
10
20
30
40
50
60
70
80
90

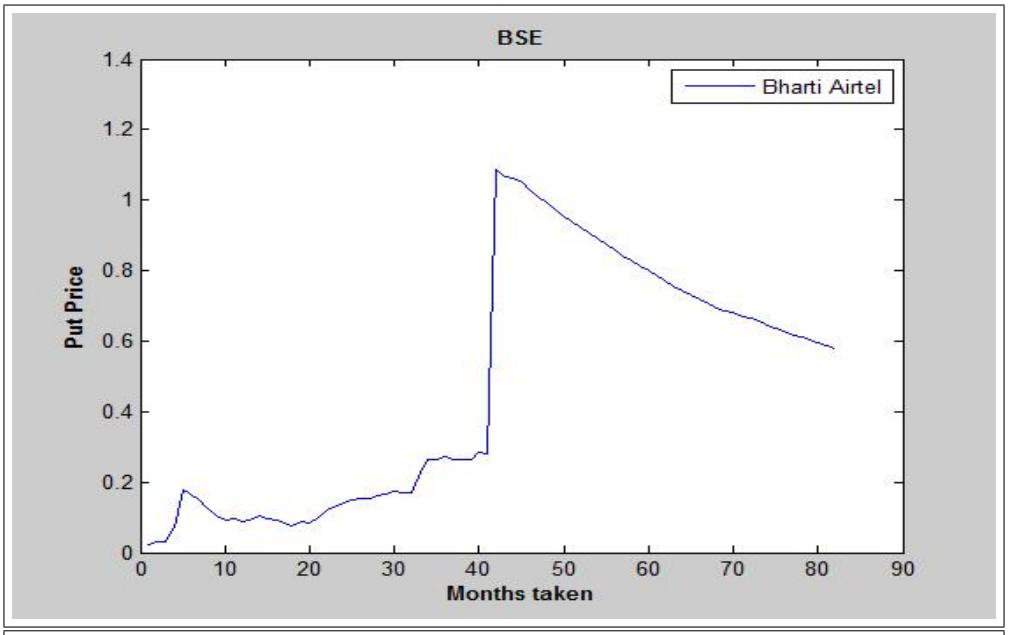

BSE
ITC
Put Price
Months taken
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
10
20
30
40
50
60
70
80
90

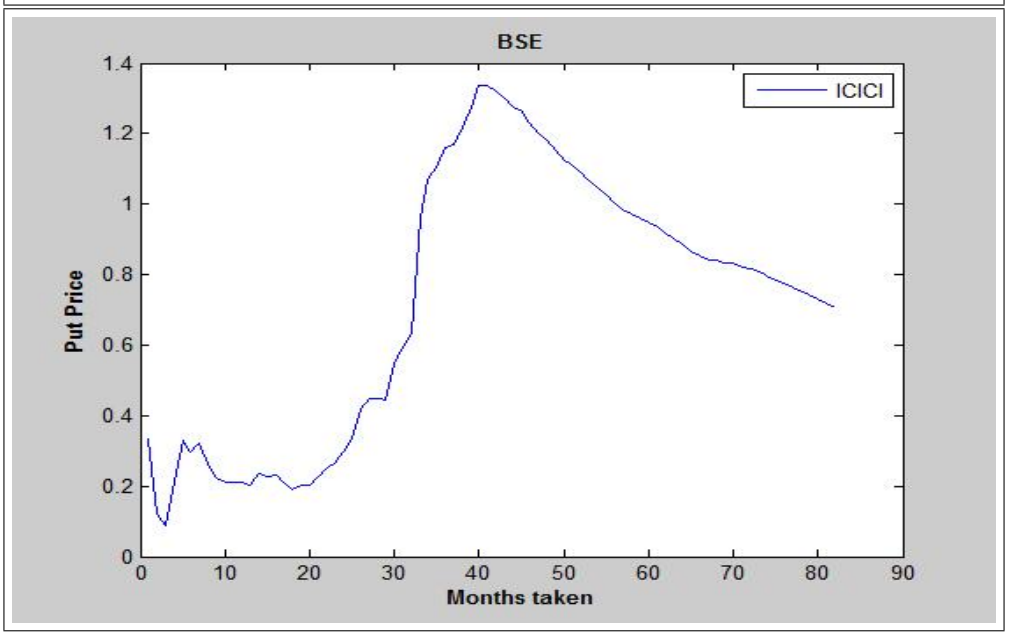

BSE
Tata Steel
Put Price
Months taken
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
20
30
40
50
60
70
80
90


BSE
Infosys
Put Price
Months taken
45
40
35
30
25
20
15
10
5
0
0
10
20
30
40
50
60
70
80
90


BSE
HDFC
Put Price
Months taken
0
5
10
15
0
10
20
30
40
50
60
70
80
90

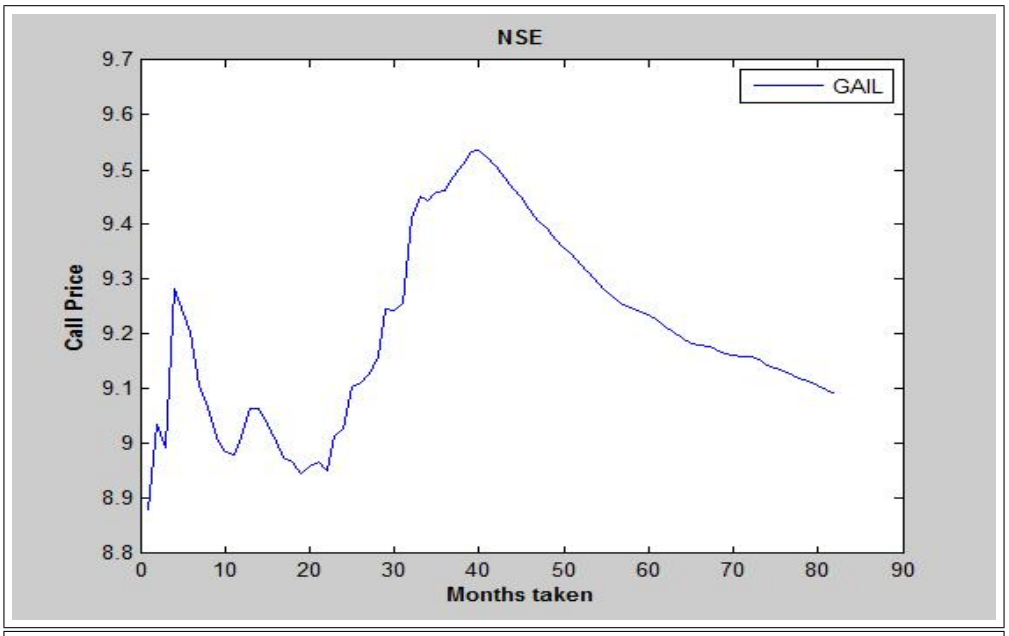

BSE
Bharti Airtel
Put Price
Months taken
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
10
20
30
40
50
60
70
80
90

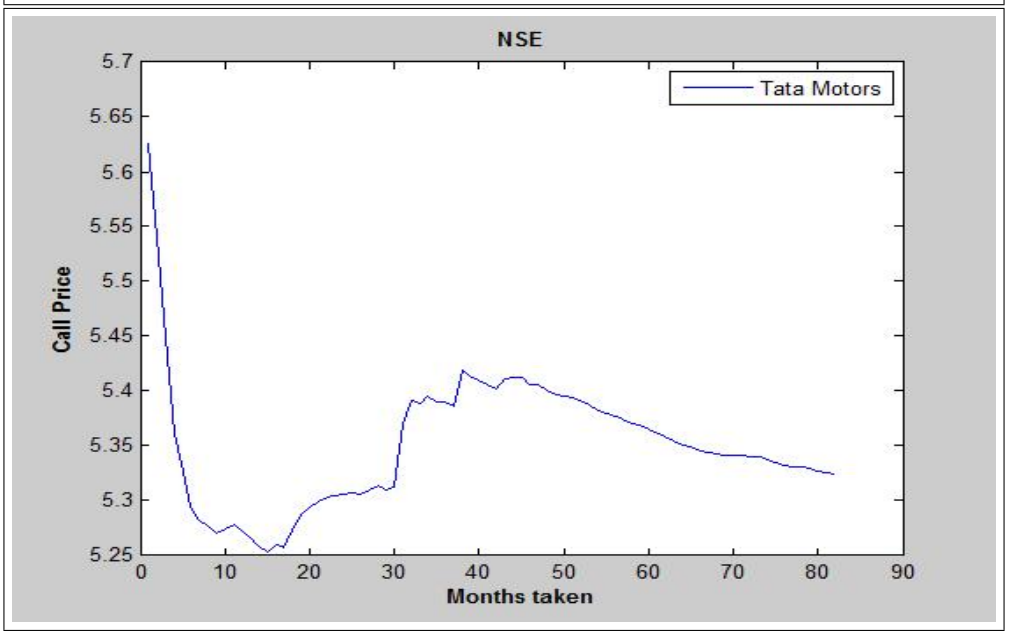

BSE
Bharti Airtel
Put Price
Months taken
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
10
20
30
40
50
60
70
80
90

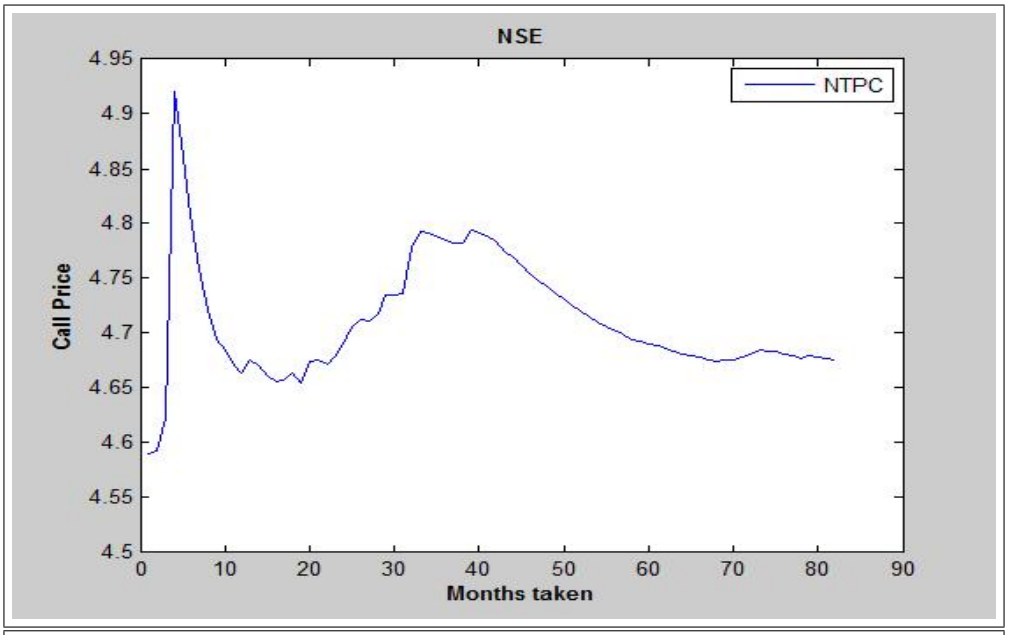

BSE
ICICI
Put Price
Months taken
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
10
20
30
40
50
60
70
80
90

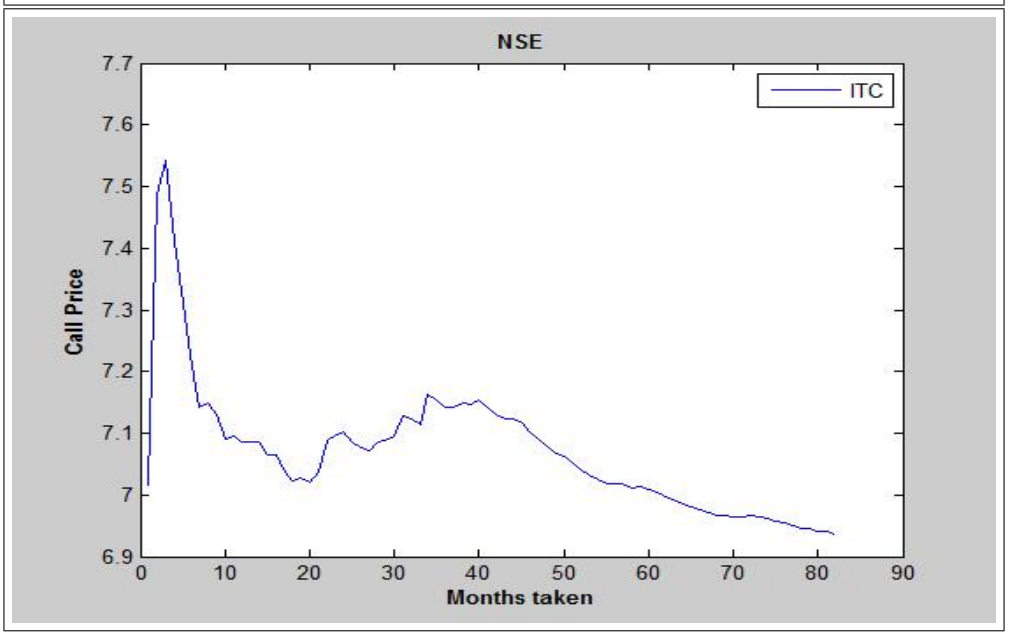
1.10 Option Price vs Time of NSE Stocks

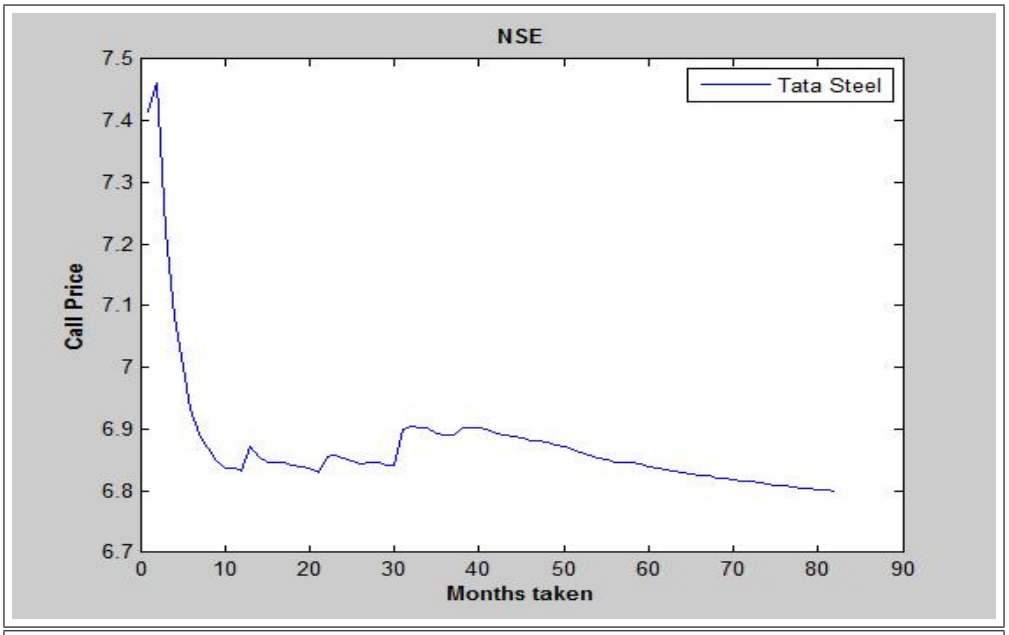
1.10.1 NSE Call

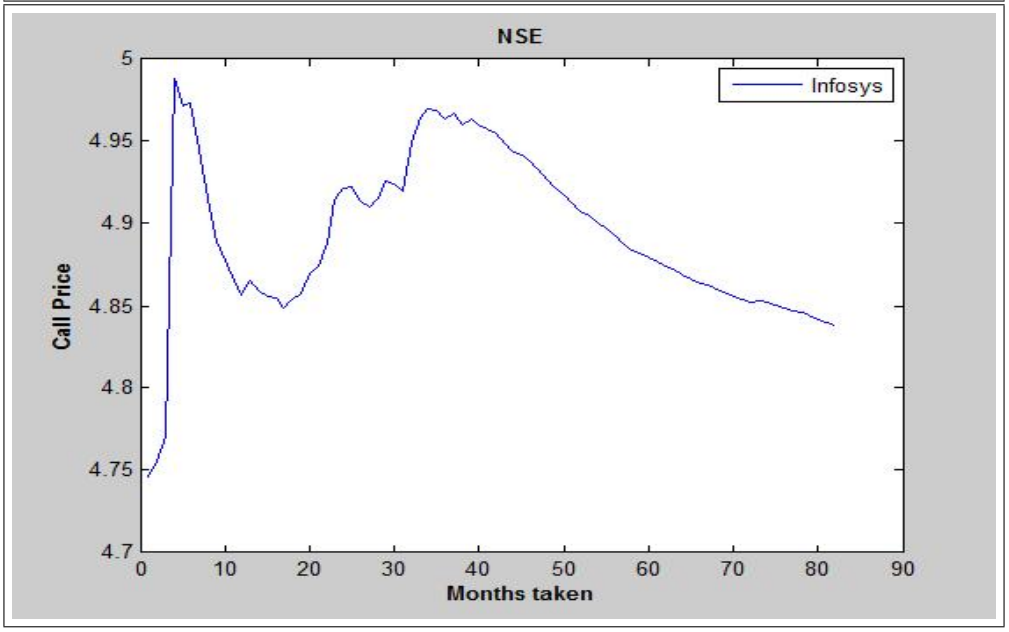


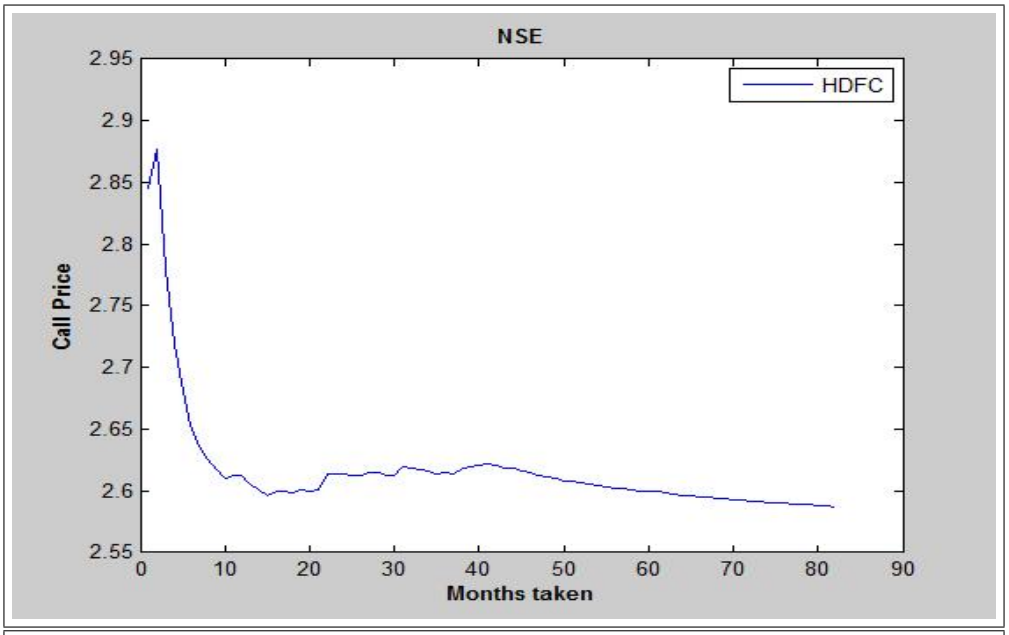


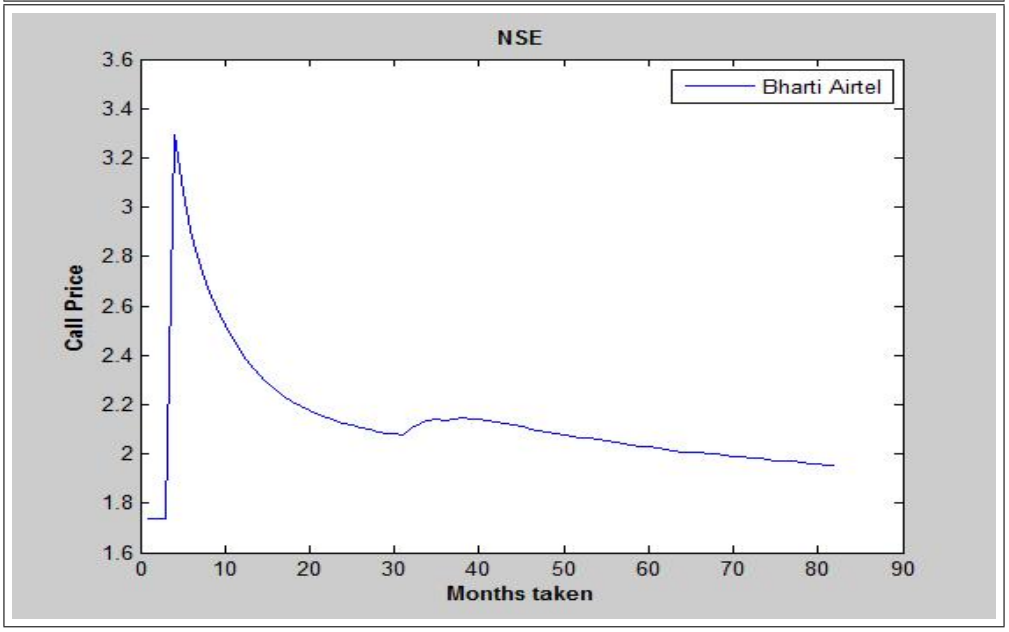

NSE
NTPC
Call Price
Months taken
4.95
4.9
4.85
4.8
4.75
4.7
4.65
4.6
4.55
4.5
0
10
20
30
40
50
60
70
80
90

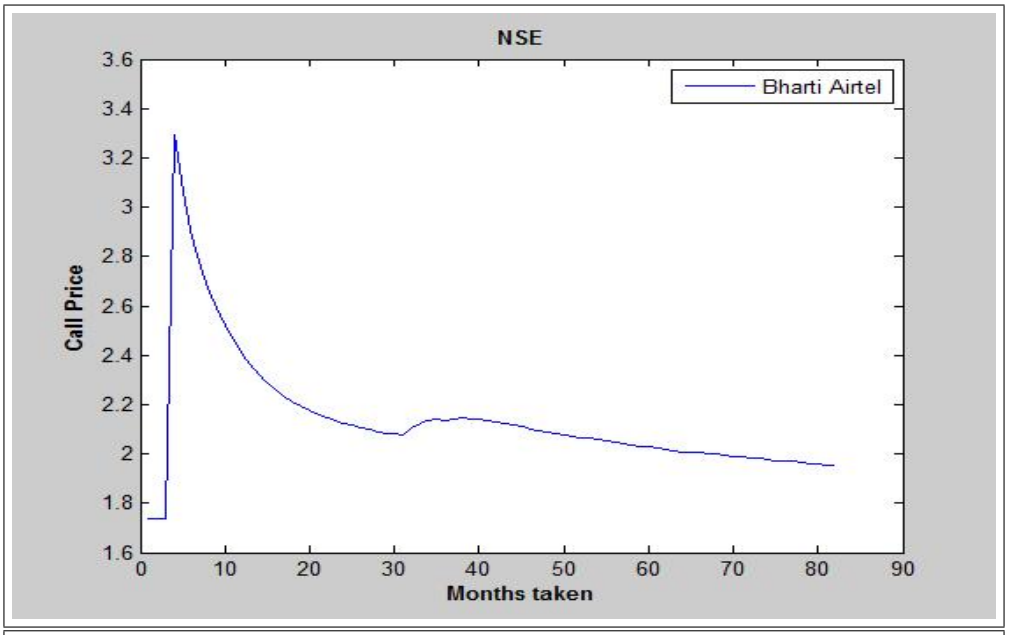

NSE
ITC
Call Price
Months taken
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7
6.9
0
10
20
30
40
50
60
70
80
90

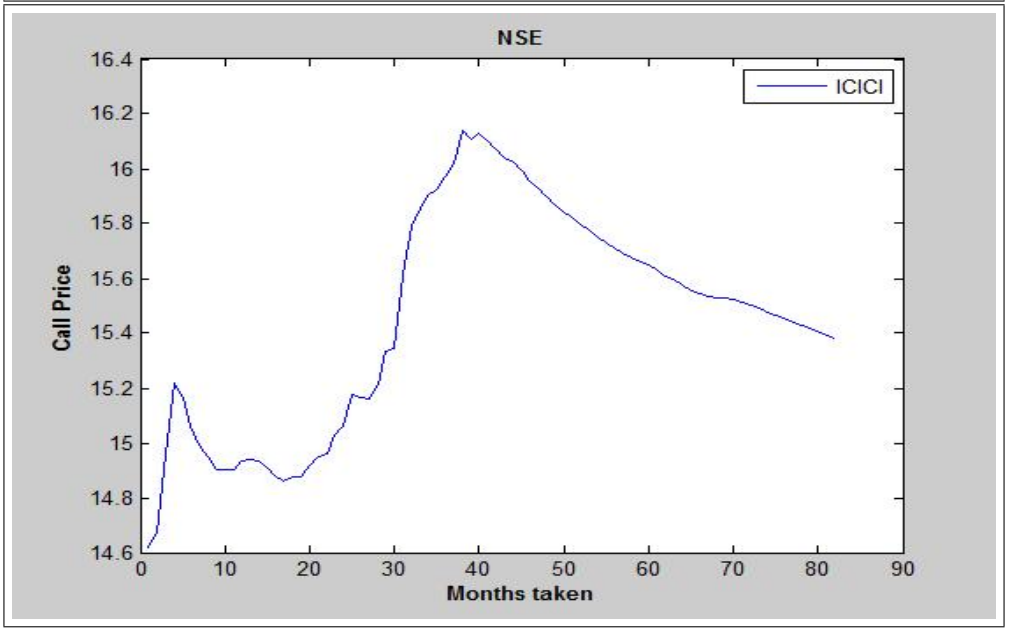

NSE
Tata Steel
Call Price
Months taken
7.5
7.4
7.3
7.2
7.1
7
6.9
6.8
6.7
0
10
20
30
40
50
60
70
80
90

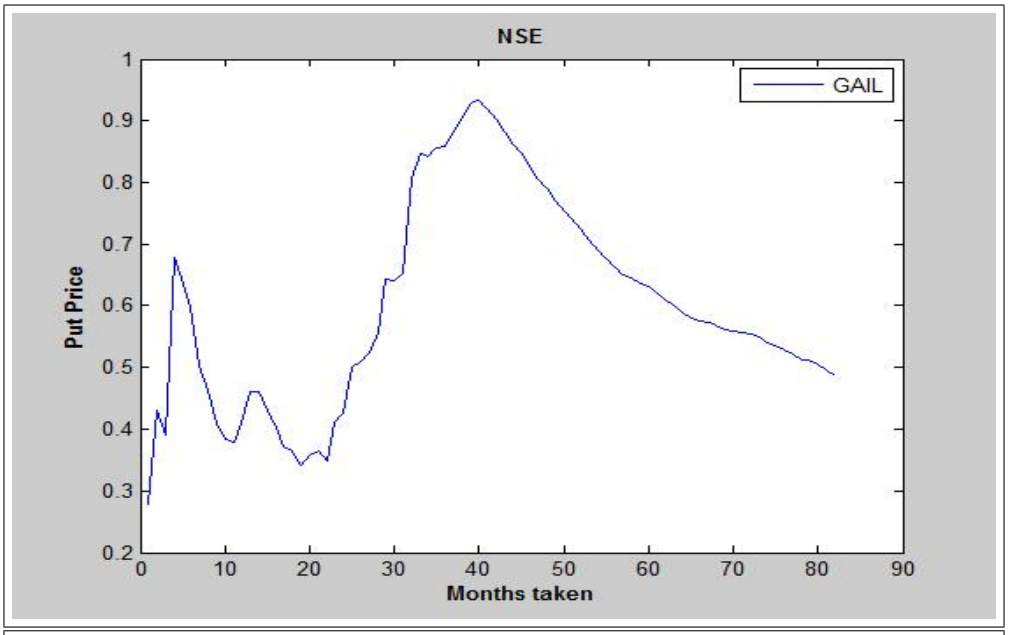

NSE
Infosys
Call Price
Months taken
5
4.95
4.9
4.85
4.8
4.75
4.7
0
10
20
30
40
50
60
70
80
90

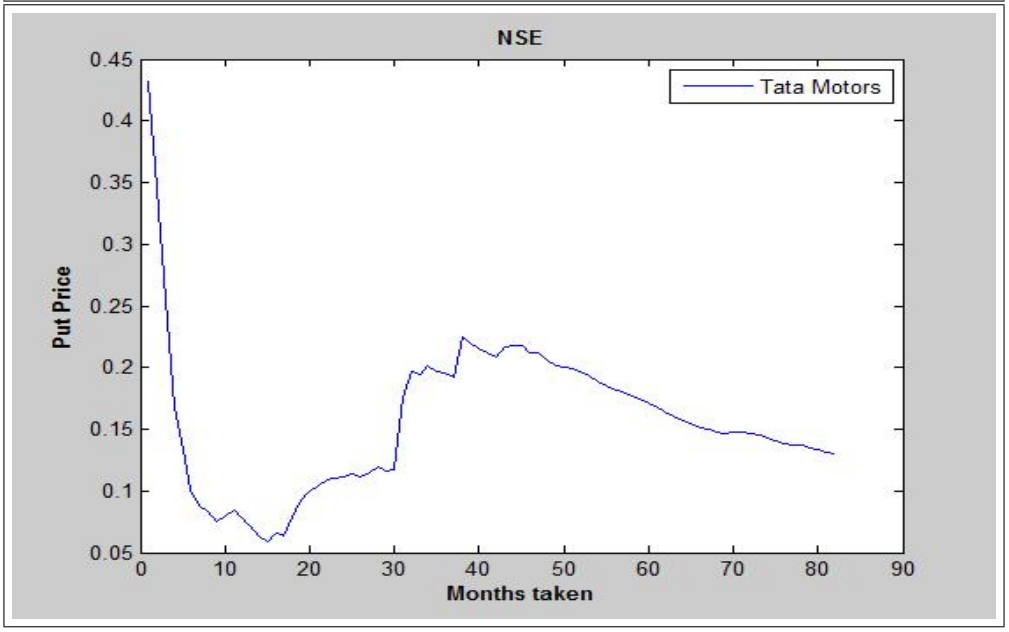

NSE
HDFC
Call Price
Months taken
2.95
2.9
2.85
2.8
2.75
2.7
2.65
2.6
2.55
0
10
20
30
40
50
60
70
80
90

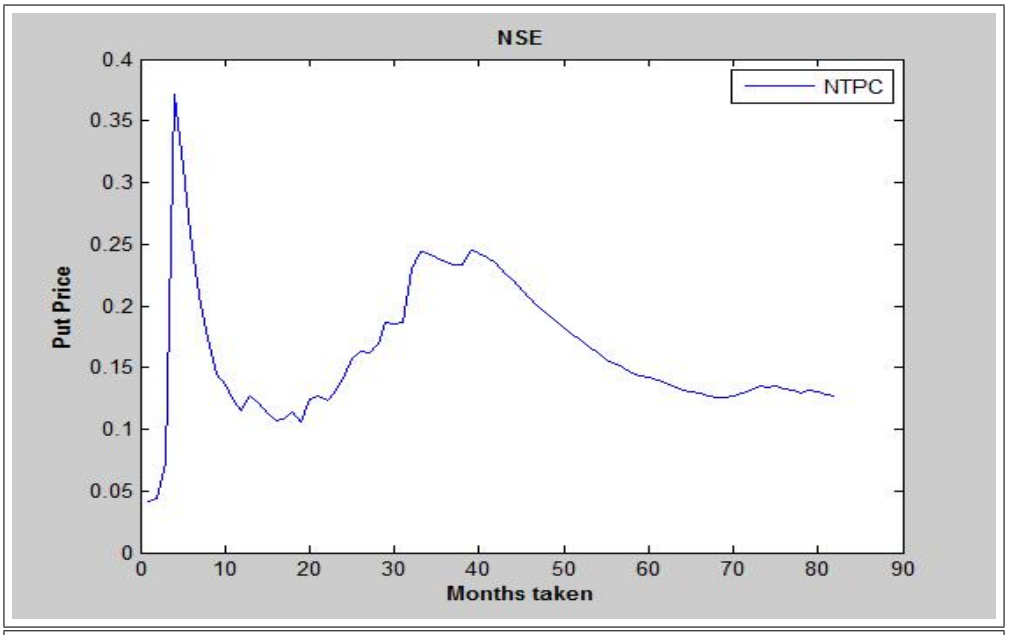

NSE
Bharti Airtel
Call Price
Months taken
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
0
10
20
30
40
50
60
70
80
90

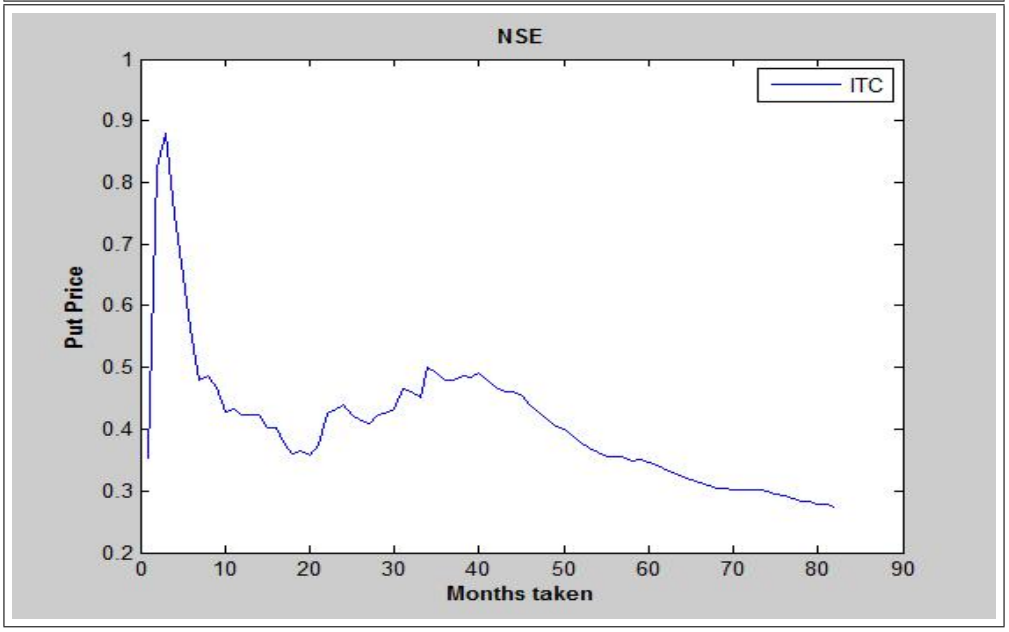

NSE
Bharti Airtel
Call Price
Months taken
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
0
10
20
30
40
50
60
70
80
90

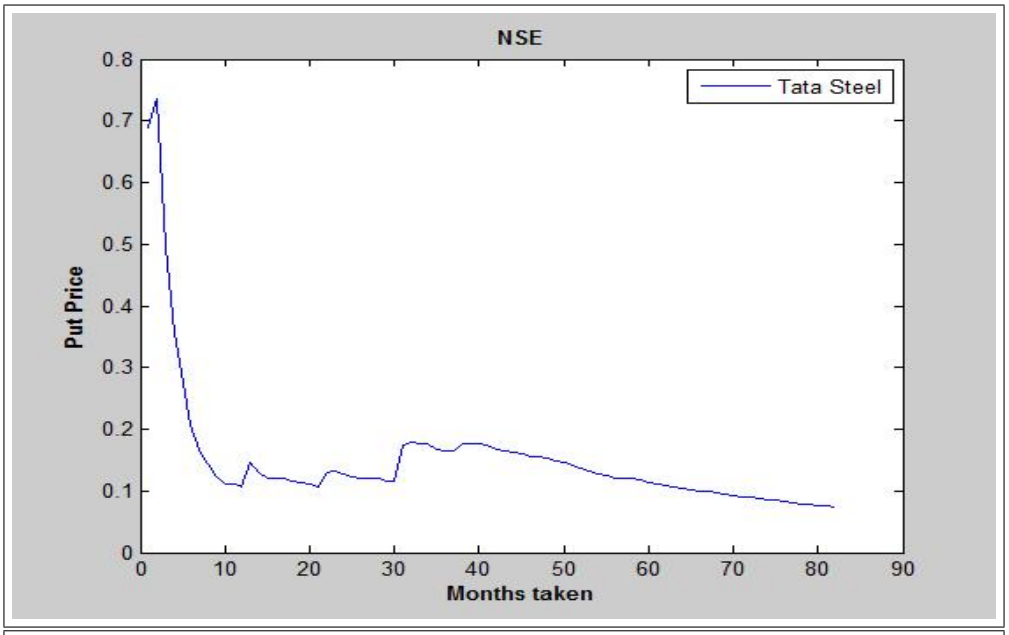

NSE
ICICI
Call Price
Months taken
16.4
16.2
16
15.8
15.6
15.4
15.2
15
14.8
14.6
0
10
20
30
40
50
60
70
80
90

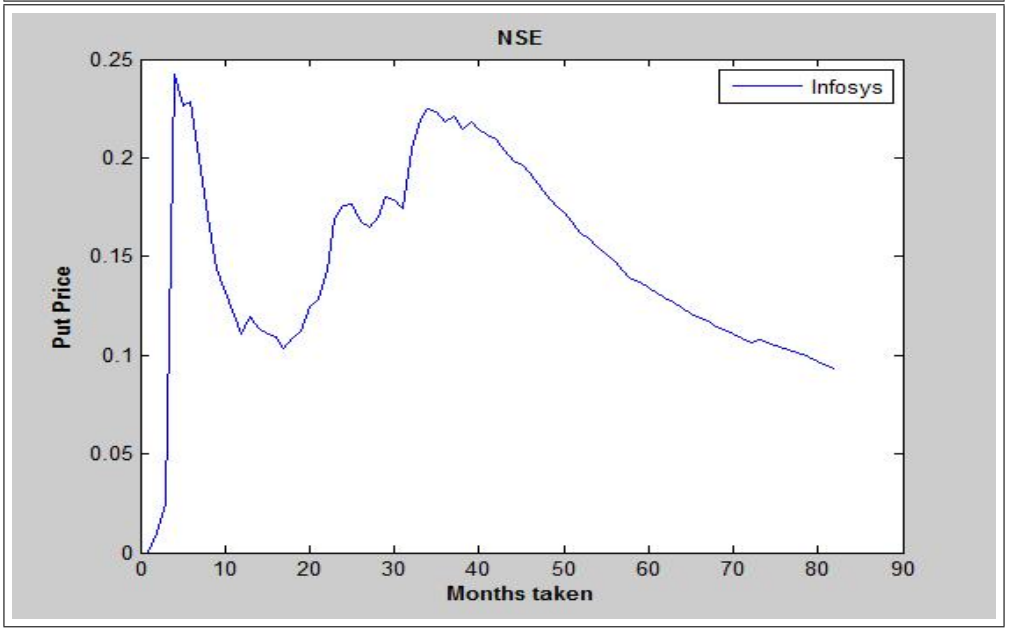

NSE
GAIL
Put Price
Months taken
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
10
20
30
40
50
60
70
80
90

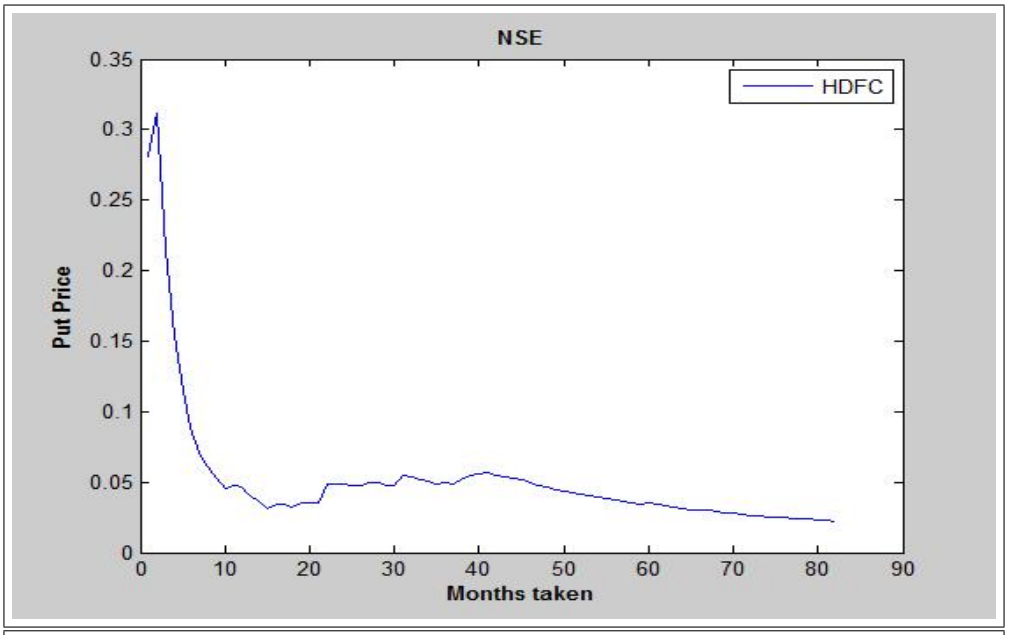

NSE
Tata Motors
Put Price
Months taken
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
10
20
30
40
50
60
70
80
90

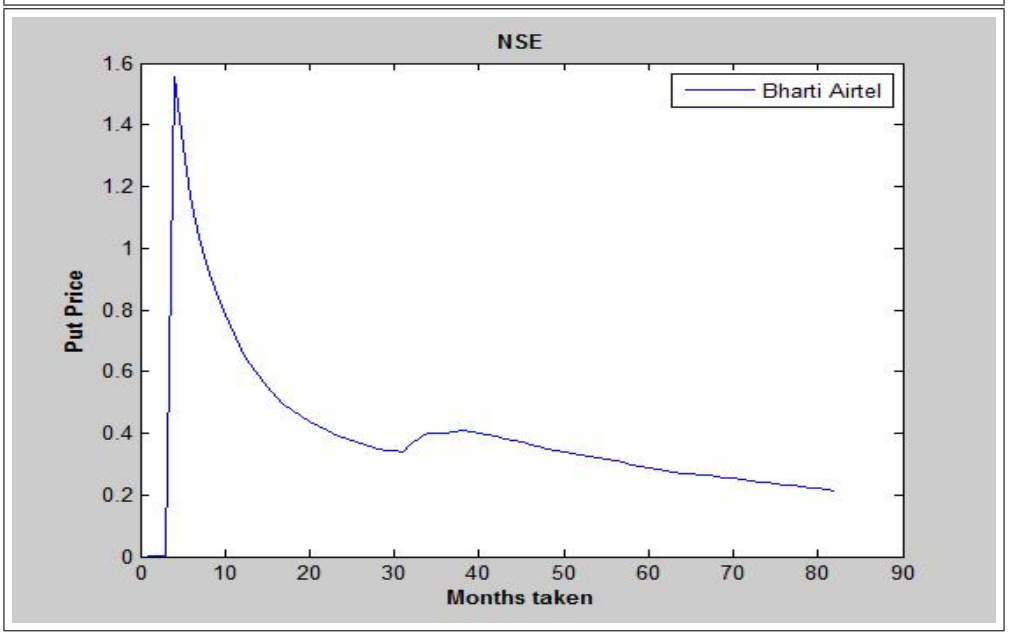

NSE
NTPC
Put Price
Months taken
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0
10
20
30
40
50
60
70
80
90

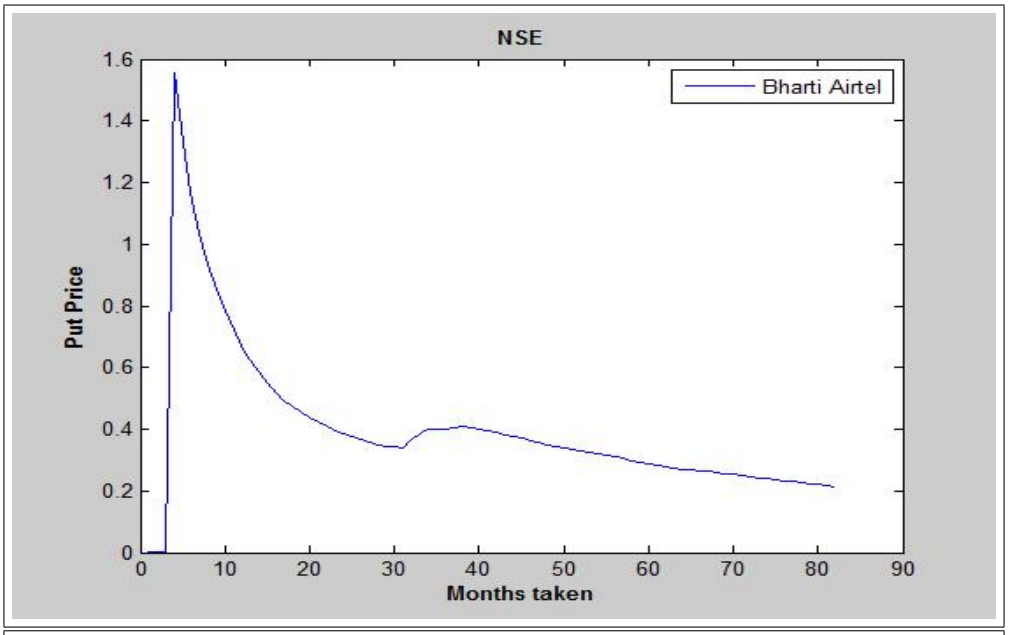

NSE
ITC
Put Price
Months taken
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
10
20
30
40
50
60
70
80
90

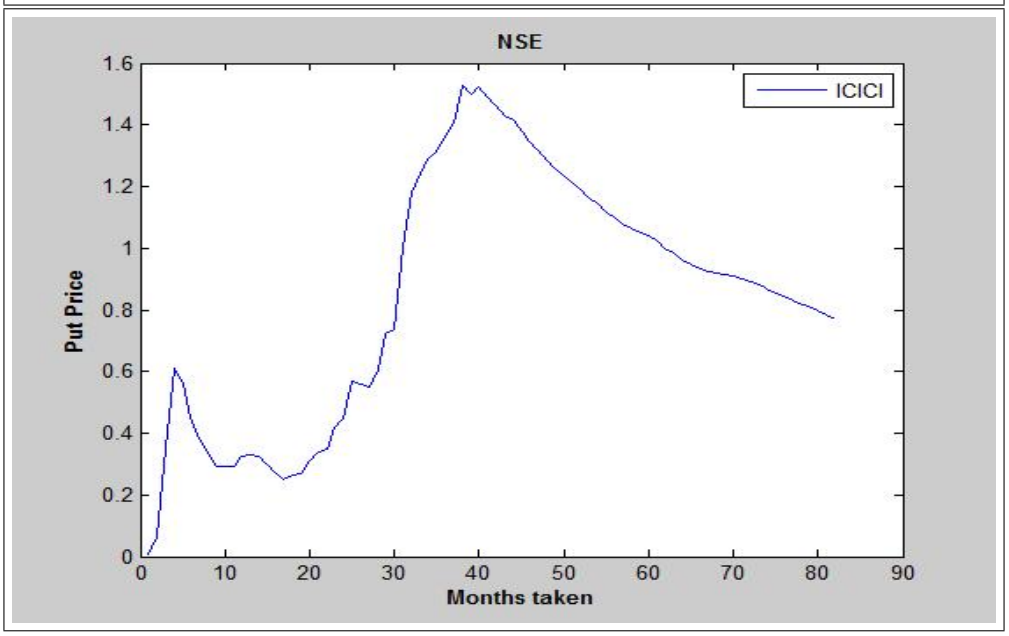

NSE
Tata Steel
Put Price
Months taken
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0
10
20
30
40
50
60
70
80
90


NSE
Infosys
Put Price
Months taken
0
0.05
0.1
0.15
0.2
0.25
0
10
20
30
40
50
60
70
80
90


NSE
HDFC
Put Price
Months taken
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
10
20
30
40
50
60
70
80
90


NSE
Bharti Airtel
Put Price
Months taken
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
70
80
90





2 Matlab Codes

2.1 Question 1

```
clear;
clc;
close all;
```

```
[num1,data1]=xlsread('bsedata1.xlsx');
n=size(num1);
for i=1:n(2)
    ret1(:,i)=price2ret(num1(:,i),[],'Periodic');
end
n=size(ret1);
ret1_new=ret1(n(1)-20:n(1),1:n(2));
for i=1:n(2)
    vol1(i)=sqrt(252*var(ret1_new(:,i)));
end
bar(vol1);
set(gca,'XTickLabel',data1);
xlabel('\bfStocks');
ylabel('\bfVolatility');
title('\bfHistorical volatility for BSE stocks from last one
    month data');

figure();
[num2,data2]=xlsread('nsedata1.xlsx');
n=size(num2);
for i=1:n(2)
    ret2(:,i)=price2ret(num2(:,i),[],'Periodic');
end
n=size(ret2);
ret2_new=ret2(n(1)-20:n(1),1:n(2));
for i=1:n(2)
    vol2(i)=sqrt(252*var(ret2_new(:,i)));
end
bar(vol2);
set(gca,'XTickLabel',data2);
xlabel('\bfStocks');
ylabel('\bfVolatility');
title('\bfHistorical volatility for NSE stocks from last one
    month data');

a=0.5:0.1:1.5;
for i=1:n(2)
    r=0.05;
    T=0.5;
    sig=vol1(i);
    s=num1(n(1),i);
    for j=1:length(a)
```

```
        k=a(j)*s;
        d1=(log(s/k)+(r+0.5*sig*sig)*T)/(sig*sqrt(T));
        d2=(log(s/k)+(r-0.5*sig*sig)*T)/(sig*sqrt(T));
        c(j,i)=normcdf(d1)*s-normcdf(d2)*k*exp(-r*T);
        p(j,i)=normcdf(-d2)*k*exp(-r*T)-normcdf(-d1)*s;
    end
end
xlswrite('bse_call.xlsx',c,'B2:K12');
xlswrite('bse_call.xlsx',data1,'B1:K1');
xlswrite('bse_call.xlsx',a','A2:A12');
xlswrite('bse_call.xlsx','A','A1:A1');
xlswrite('bse_put.xlsx',p,'B2:K12');
xlswrite('bse_put.xlsx',data1,'B1:K1');
xlswrite('bse_put.xlsx',a','A2:A12');
xlswrite('bse_put.xlsx','A','A1:A1');

a=0.5:0.1:1.5;
for i=1:n(2)
    r=0.05;
    T=0.5;
    sig=vol2(i);
    s=num2(n(1),i);
    for j=1:length(a)
        k=a(j)*s;
        d1=(log(s/k)+(r+0.5*sig*sig)*T)/(sig*sqrt(T));
        d2=(log(s/k)+(r-0.5*sig*sig)*T)/(sig*sqrt(T));
        c(j,i)=normcdf(d1)*s-normcdf(d2)*k*exp(-r*T);
        p(j,i)=normcdf(-d2)*k*exp(-r*T)-normcdf(-d1)*s;
    end
end
xlswrite('nse_call.xlsx',c,'B2:K12');
xlswrite('nse_call.xlsx',data2,'B1:K1');
xlswrite('nse_call.xlsx',a','A2:A12');
xlswrite('nse_call.xlsx','A','A1:A1');
xlswrite('nse_put.xlsx',p,'B2:K12');
xlswrite('nse_put.xlsx',data2,'B1:K1');
xlswrite('nse_put.xlsx',a','A2:A12');
xlswrite('nse_put.xlsx','A','A1:A1');

r=0.05;
no=floor(n(1)/21);
v=zeros(no,n(2));
cc=zeros(no,n(2));
```

```
pp=zeros(no,n(2));
for i=1:no
    ret1_new=ret1(n(1)-21*i+1:n(1),1:n(2));
    for j=1:n(2)
        v(i,j)=sqrt(var(ret1_new(:,j)));
        T=0.5;
        sig=v(i,j);
        s=num1(n(1),j);
        k=s;
        d1=(log(s/k)+(r+0.5*sig*sig)*T)/(sig*sqrt(T));
        d2=(log(s/k)+(r-0.5*sig*sig)*T)/(sig*sqrt(T));
        cc(i,j)=normcdf(d1)*s-normcdf(d2)*k*exp(-r*T);
        pp(i,j)=normcdf(-d2)*k*exp(-r*T)-normcdf(-d1)*s;
    end
end
for i=1:n(2)
    figure();
    plot(v(:,i));
    xlabel('\bfMonths taken');
    ylabel('\bfVolatility');
    legend(data1(i));
    title('\bfBSE');
    f = getframe(gcf);
    imwrite(f.cdata,['BSE_volatility_' num2str(i) '.jpg']);
    close;
    figure();
    plot(cc(:,i));
    xlabel('\bfMonths taken');
    ylabel('\bfCall Price');
    legend(data1(i));
    title('\bfBSE');
    f = getframe(gcf);
    imwrite(f.cdata,['BSE_call_' num2str(i) '.jpg']);
    close;
    figure();
    plot(pp(:,i));
    xlabel('\bfMonths taken');
    ylabel('\bfPut Price');
    legend(data1(i));
    title('\bfBSE');
    f = getframe(gcf);
    imwrite(f.cdata,['BSE_put_' num2str(i) '.jpg']);
    close;
```

```
end

r=0.05;
no=floor(n(1)/21);
v=zeros(no,n(2));
cc=zeros(no,n(2));
pp=zeros(no,n(2));
for i=1:no
    ret2_new=ret2(n(1)-21*i+1:n(1),1:n(2));
    for j=1:n(2)
        v(i,j)=sqrt(var(ret2_new(:,j)));
        T=0.5;
        sig=v(i,j);
        s=num2(n(1),j);
        k=s;
        d1=(log(s/k)+(r+0.5*sig*sig)*T)/(sig*sqrt(T));
        d2=(log(s/k)+(r-0.5*sig*sig)*T)/(sig*sqrt(T));
        cc(i,j)=normcdf(d1)*s-normcdf(d2)*k*exp(-r*T);
        pp(i,j)=normcdf(-d2)*k*exp(-r*T)-normcdf(-d1)*s;
    end
end
for i=1:n(2)
    figure();
    plot(v(:,i));
    xlabel('\bfMonths taken');
    ylabel('\bfVolatility');
    legend(data1(i));
    title('\bfNSE');
    f = getframe(gcf);
    imwrite(f.cdata,['NSE_volatility_' num2str(i) '.jpg']);
    close;
    figure();
    plot(cc(:,i));
    xlabel('\bfMonths taken');
    ylabel('\bfCall Price');
    legend(data1(i));
    title('\bfNSE');
    f = getframe(gcf);
    imwrite(f.cdata,['NSE_call_' num2str(i) '.jpg']);
    close;
    figure();
    plot(pp(:,i));
    xlabel('\bfMonths taken');
```

```
    ylabel('\bfPut Price');
    legend(data1(i));
    title('\bfNSE');
    f = getframe(gcf);
    imwrite(f.cdata,['NSE_put_' num2str(i) '.jpg']);
    close;
end
```

3 References

- wikipedia...