

First Report - Financial Mathematics for data
science
course held by: professor Martino Grasselli

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20 March 2022

$$return_t = \frac{adj.S_t - adj.S_t}{adj.S_t} \quad (1)$$

$$\sigma_{year} = \sigma_{day} \sqrt{252} \quad (2)$$

$$u = e^{\sqrt{T}\sigma_{year}} \quad (3)$$

$$d = e^{-\sqrt{T}\sigma_{year}} \quad (4)$$

$$CapitalisationFactor(simplecompounding) = 1 + Libor \cdot T \quad (5)$$

$$CapitalisationFactor(simplediscounting) = \frac{1}{1 + Libor \cdot T} \quad (6)$$

$$q = \frac{(1 + rT) - d}{u - d} \quad (7)$$

$$f = \frac{qf_u + (1 - q)f_d}{1 + rT} \quad (8)$$

where

$$f_u = S_0 \cdot u - k \quad (9)$$

$$f_d = S_0 \cdot d - k \quad (10)$$

Biogen Inc. (BIIB)

Previous Close	210.92	Market Cap	31.206B	Dividends & Splits	
Open	210.92	Beta (5Y Monthly)	0.45	Forward Annual Dividend Rate ⁴	N/A
Bid	212.72 x 800	PE Ratio (TTM)	20.42	Forward Annual Dividend Yield ⁴	N/A
Ask	212.89 x 800	EPS (TTM)	10.40	Trailing Annual Dividend Rate ³	0.00
Day's Range	210.41 - 213.02	Earnings Date	Apr 20, 2022 - Apr 25, 2022	Trailing Annual Dividend Yield ³	0.00%
52 Week Range	192.67 - 468.55	Forward Dividend & Yield	N/A (N/A)	5 Year Average Dividend Yield ⁴	N/A
Volume	118,127	Ex-Dividend Date	N/A	Payout Ratio ⁴	0.00%
Avg. Volume	1,587,668	1y Target Est	252.62	Dividend Date ³	N/A
Major Holders Breakdown				Ex-Dividend Date ⁴	N/A
0.68%	% of Shares Held by All Insider			Last Split Factor ²	3:1
86.60%	% of Shares Held by Institutions			Last Split Date ³	Jan 17, 2001
87.19%	% of Float Held by Institutions			Financial Highlights	
1,472	Number of Institutions Holding Shares			Fiscal Year	
				Fiscal Year Ends	Dec 30, 2021
				Most Recent Quarter (mrq)	Dec 30, 2021

Brief summary

Biogen, Inc. is a biopharmaceutical company, which engages in discovering, developing, and delivering therapies for neurological and neurodegenerative diseases. It offers TECFIDERA, VUMERITY, AVONEX, PLEGRIDY, TYSABRI, and FAMPYRA for the treatment of multiple sclerosis, SPINRAZA for the treatment of spinal muscular atrophy, and FUMADERM for the treatment of severe plaque psoriasis. The company was founded by Charles Weissmann, Heinz Schaller, Kenneth Murray, Walter Gilbert, and Phillip Allen Sharp in 1978 and is headquartered in Cambridge, MA. The company has collaboration and license agreements with Acorda Therapeutics, Inc.; Alkermes Pharma Ireland Limited; Denali Therapeutics Inc.; Eisai Co., Ltd.; Genentech, Inc.; Neurimmune SubOne AG; Ionis Pharmaceuticals, Inc.; Samsung Bioepis Co., Ltd.; Sangamo Therapeutics, Inc.; and Sage Therapeutics.

Description

Biogen Inc. discovers, develops, manufactures, and delivers therapies for treating neurological and neurodegenerative diseases. The company offers TECFIDERA, VUMERITY, and FAMPYRA for multiple sclerosis (MS); SPINRAZA for spinal muscular atrophy; and FUMADERM to treat plaque psoriasis. It also provides BENEPALI, an etanercept biosimilar referencing ENBREL; ADUHELM for the treatment of Alzheimer's disease; IMRALDI, an adalimumab biosimilar referencing HUMIRA; and FLIXABI, an infliximab biosimilar referencing REMICADE. In addition, the company offers RITUXAN for treating non-Hodgkin's lymphoma, chronic lymphocytic leukemia (CLL), rheumatoid arthritis, two forms of ANCA-associated vasculitis, and pemphigus vulgaris; RITUXAN HYCELA for non-Hodgkin's lymphoma and CLL. Further, it develops BIIB135, BIIB061, BIIB091, and BIIB107 for MS and neuroimmunology; Aducanumab, Lecanemab, BIIB080 to treat Alzheimer's disease and dementia; BIIB067 to treat neuromuscular disorders; for treating Parkinson's disease and movement disorders; BIIB125 and BIIB104 for treating neuropsychiatry; Dapirolizumab pegol and BIIB059 to treat immunology related diseases; BIIB093 and BIIB131 to treat acute neurology; BIIB074 for neuropathic pain; and BYOOVIZ and SB15 biosimilars.

The aim of the report is providing the price of a Call (with maturity 3 or 6 months) by using the static binomial model (references John C. Hull "Options, futures and other derivatives") and compare it with the market quotes.

Every data and tables are taken from Yahoo Finance in the sections "historical data" and "options", the chosen asset is the BIIB (Biogen Inc.), here there is a first problem to deal with the partial absence of data in the historical section, the last 3 months data cover only 62 days of the market.

At first has been selected a Call with maturity around 3 and 6 months and strike price at the money (close to the current value of the stock), from here the MID PRICE has been defined as the average between BID PRICE and ASK PRICE, this market quote would be the target price of the adopted model.

Then the last 3 and 6 months of daily data have been uploaded to the excel file (attached at the beginning of the report) then it is possible to use the column of "adjusted close price" (that takes into account for dividend splits etc) to calculate the return at time t as shown in **equation 1**.

The column of daily returns has been used to calculate the daily volatility as the standard deviation of the daily returns and the annual volatility, shown in **equation 2**.

The parameters u and d of the binomial model are related to the annual volatility and maturity (3 or 6 months) and can be computed following **eq.s 3-4**, here we do not expect significant differences between the two maturities.

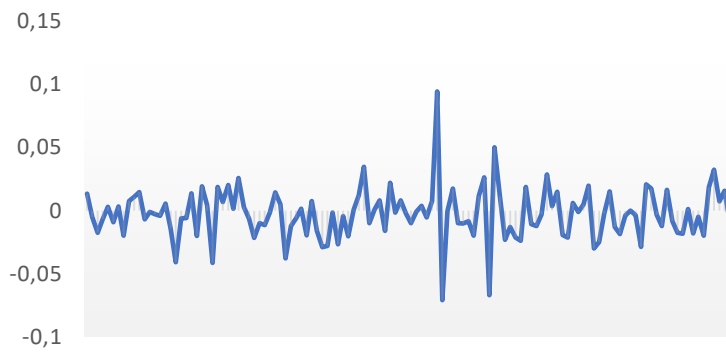
The next step consist of taking the data of the Libor rate from the global-rate.com site corresponding to maturity 3 and 6 months (USD currency), from here it is plain to calculate the capitalisation factor using simple compounding or discounting, seen in **eq.s 5-6**.

Finally it is time to calculate the risk neutral probability weight q (**eq. 7**) and apply the risk neutral pricing formula for the price of the Call (**eq. 8**) where the payoff for the up\down case are listed in **eq.s 9-10** (s_0 is the most recent close available in the excel data), there is no need to apply the formula for the case of a dividend paying asset.

The obtained results, shown below, are quite different from target price, in the order of 10%, in the 6 months call option, to 45% in the 3 months call option. It is probably caused by some inefficiency in the model estimate but also due to the difference between historical and implied volatility.



Returns 6 months



3months

bid	ask	mid	strike price	maturity	current value of stock
12,6	13,7	13,15	210	20/05/2022	209,79
sigma_day	sigma_year	maturity	u	d	interest rate
0,023853	0,378648	0,25	1,2084324	0,827518363	-0,0021

Libor

0,958%

capitalisation factor(simple compounding)

1,002395

capitalisation factor(simple discounting)

0,997611

q(risk neutral probability weight)

0,451432

Option Price(risk neutral pricing formula for the price of the call)

19,65528

6months

bid	ask	mid	strike price	maturity	current value of stock
24,8	32,1	28,45	210	21/10/2022	210,88
sigma_day	sigma_year	maturity	u	d	interest rate
0,020267	0,321731	0,5	1,25545475	0,796524128	0,0088

Libor

1,336%

capitalisation factor(simple compounding)

1,006681

capitalisation factor(simple discounting)

0,993364

q(risk neutral probability weight)

0,452957

Option Price(risk neutral pricing formula for the price of the call)

27,23986

3 months

Date	Open	High	Low	Close	Adj Close (tak	Volume	daily return
18/11/2021	259,980011	260,730011	253,179993	256,790009	256,790009	975800	
19/11/2021	257,709991	260,160004	254,570007	257,190002	257,190002	898800	0,001558
22/11/2021	257,970001	258,890015	250,669998	252,210007	252,210007	1290300	-0,01936
23/11/2021	252,070007	254,449997	249,520004	254,149994	254,149994	799100	0,007692
24/11/2021	253,179993	253,179993	247,660004	250,130005	250,130005	1579800	-0,01582
26/11/2021	250,779999	250,779999	242,020004	242,899994	242,899994	1300400	-0,02891
29/11/2021	245,360001	245,5	235,179993	236,110001	236,110001	2229100	-0,02795
30/11/2021	236,5	239,770004	228,679993	235,740005	235,740005	3294300	-0,00157
01/12/2021	236,979996	239,580002	228,880005	229,5	229,5	1672700	-0,02647
02/12/2021	228,550003	229,470001	224,460007	228,520004	228,520004	1276200	-0,00427
03/12/2021	227,690002	229,039993	221,720001	223,919998	223,919998	1427700	-0,02013
06/12/2021	223,199997	226,220001	222,149994	224,110001	224,110001	1101800	0,000849
07/12/2021	225,169998	228,800003	223,649994	226,830002	226,830002	941300	0,012137
08/12/2021	227,179993	235,220001	225,899994	234,720001	234,720001	1419100	0,034784
09/12/2021	232,860001	236,889999	230,809998	232,429993	232,429993	1365200	-0,00976
10/12/2021	232,800003	233,690002	229,520004	232,619995	232,619995	998800	0,000817
13/12/2021	231,679993	235,800003	230,179993	234,5	234,5	1236600	0,008082
14/12/2021	233,929993	236,630005	230,169998	230,759995	230,759995	1232500	-0,01595
15/12/2021	230,199997	236,369995	228,949997	235,880005	235,880005	1262400	0,022188
16/12/2021	237,289993	243,429993	234,860001	235,520004	235,520004	1252200	-0,00153
17/12/2021	233	239,899994	232,580002	237,429993	237,429993	2262900	0,00811
20/12/2021	239,75	240	234,25	236,960007	236,960007	1127700	-0,00198
21/12/2021	235,050003	237,600006	230,050003	234,649994	234,649994	1030200	-0,00975
22/12/2021	236,259995	236,479996	231,289993	234,479996	234,479996	783300	-0,00072
23/12/2021	232,949997	236,210007	232,039993	235,410004	235,410004	1003300	0,003966
27/12/2021	235,229996	236,699997	232,360001	234,190002	234,190002	1744600	-0,00518
28/12/2021	233,339996	236,960007	233,020004	235,990005	235,990005	775000	0,007686
29/12/2021	235	265,540009	234,130005	258,309998	258,309998	6869700	0,09458
30/12/2021	245,190002	247	237,050003	240	240	4423100	-0,07088
31/12/2021	239,759995	243,710007	239,5	239,919998	239,919998	1532700	-0,00033
03/01/2022	240,149994	247,509995	238,070007	244,139999	244,139999	1642200	0,017589
04/01/2022	245,130005	245,449997	239	241,729996	241,729996	1283400	-0,00987
05/01/2022	241,729996	249	239,179993	239,270004	239,270004	1167400	-0,01018
06/01/2022	240,300003	242,449997	236,850006	237,300003	237,300003	1036900	-0,00823
07/01/2022	235,550003	236,899994	231,619995	232,600006	232,600006	1394900	-0,01981
10/01/2022	232,75	235,550003	230,539993	235,309998	235,309998	1754000	0,011651
11/01/2022	235,399994	243,710007	235	241,520004	241,520004	1557700	0,026391
12/01/2022	223,100006	227,589996	217,100006	225,339996	225,339996	7511100	-0,06699
13/01/2022	225,300003	239,639999	225,300003	236,669998	236,669998	3781400	0,05028
14/01/2022	235,080002	239,470001	233,800003	239,300003	239,300003	1768000	0,011113
18/01/2022	238,899994	238,899994	231,369995	233,809998	233,809998	1631500	-0,02294
19/01/2022	235,509995	235,509995	230,649994	230,809998	230,809998	1258500	-0,01283
20/01/2022	231,279999	233,119995	225,619995	225,910004	225,910004	1471400	-0,02123
21/01/2022	225,369995	226,369995	220,289993	220,520004	220,520004	2205600	-0,02386
24/01/2022	220,220001	224,869995	214,880005	224,690002	224,690002	1995700	0,01891

25/01/2022	221,160004	224,910004	218,369995	222,309998	222,309998	1507200	-0,01059
26/01/2022	223,139999	226,880005	218,229996	219,600006	219,600006	1684500	-0,01219
27/01/2022	221,259995	223,740005	218,199997	218,940002	218,940002	1098000	-0,00301
28/01/2022	218,160004	225,229996	217,919998	225,210007	225,210007	1325600	0,028638
31/01/2022	223,029999	228,009995	221,880005	226	226	2518500	0,003508
01/02/2022	227,169998	231,220001	226,949997	229,369995	229,369995	1049600	0,014911
02/02/2022	228,669998	228,770004	222,270004	224,960007	224,960007	1083300	-0,01923
03/02/2022	215	223,139999	212,559998	220,169998	220,169998	2005000	-0,02129
04/02/2022	215,300003	223,100006	215,270004	221,529999	221,529999	1265800	0,006177
07/02/2022	220,740005	223,429993	219,389999	221,300003	221,300003	832600	-0,00104
08/02/2022	220,369995	223,380005	216,899994	222,389999	222,389999	991300	0,004925
09/02/2022	224,330002	228,529999	222,210007	226,809998	226,809998	989700	0,019875
10/02/2022	224,470001	226,970001	219,029999	220,039993	220,039993	1316000	-0,02985
11/02/2022	219,240005	221,580002	214,110001	214,589996	214,589996	1118600	-0,02477
14/02/2022	214,869995	215,369995	211,289993	214,119995	214,119995	872900	-0,00219
15/02/2022	214,009995	217,869995	214,009995	217,369995	217,369995	741500	0,015178
16/02/2022	216,729996	216,729996	213,389999	214,550003	214,550003	763800	-0,01297
17/02/2022	212,600006	214,139999	209,070007	210,600006	210,600006	1083600	-0,01841
18/02/2022	209,279999	211,5	207,610001	209,789993	209,789993	1053400	-0,00385

6 months

Date	Open	High	Low	Close	Adj Close	Volume	daily return
22/09/2021	289,440002	292,170013	285,399994	289,320007	289,320007	1420100	
23/09/2021	293,690002	299,829987	292,100006	293,200012	293,200012	919300	0,013411
24/09/2021	289,859985	293,470001	289	291,709991	291,709991	817500	-0,00508
27/09/2021	290,549988	291	286,160004	286,619995	286,619995	704300	-0,01745
28/09/2021	290,820007	291,540009	284,25	284,709991	284,709991	785100	-0,00666
29/09/2021	285,76001	289,329987	284,640015	285,559998	285,559998	700700	0,002986
30/09/2021	286,230011	287,799988	282,640015	282,98999	282,98999	793900	-0,009
01/10/2021	281,350006	285,410004	279,23999	283,940002	283,940002	925800	0,003357
04/10/2021	281,440002	284,559998	277,410004	278,320007	278,320007	924900	-0,01979
05/10/2021	278,339996	282,26001	278,339996	280,440002	280,440002	1010500	0,007617
06/10/2021	280,119995	285,570007	279,119995	283,549988	283,549988	978600	0,01109
07/10/2021	285,519989	290,76001	284,579987	287,769989	287,769989	879900	0,014883
08/10/2021	287,440002	288,98999	284	285,829987	285,829987	629600	-0,00674
11/10/2021	284,649994	288,769989	283,450012	285,589996	285,589996	620600	-0,00084
12/10/2021	285,480011	288,589996	283,790009	284,790009	284,790009	616200	-0,0028
13/10/2021	284,899994	285,299988	280,5	283,649994	283,649994	521400	-0,004
14/10/2021	286	287,929993	282,649994	285,26001	285,26001	705300	0,005676
15/10/2021	285,339996	286	278,570007	281,190002	281,190002	1299600	-0,01427
18/10/2021	279,420013	279,5	269,190002	269,730011	269,730011	1496100	-0,04076
19/10/2021	270	271,660004	266,299988	268,130005	268,130005	1801700	-0,00593
20/10/2021	270,109985	277,869995	264,779999	266,570007	266,570007	2153000	-0,00582
21/10/2021	266,299988	271,940002	266,290009	270,209991	270,209991	1374200	0,013655
22/10/2021	269,380005	270,369995	264,350006	264,799988	264,799988	873200	-0,02002
25/10/2021	266	271,51001	265	269,940002	269,940002	1092900	0,019411
26/10/2021	269,880005	273,640015	267,019989	271,119995	271,119995	1453800	0,004371
27/10/2021	270,170013	270,600006	259,630005	259,950012	259,950012	1276200	-0,0412

28/10/2021	260,450012	266,5	260,450012	264,869995	264,869995	1273500	0,018927
29/10/2021	264,410004	268,320007	262,019989	266,679993	266,679993	947600	0,006834
01/11/2021	266,149994	274,75	265,5	272,100006	272,100006	1222600	0,020324
02/11/2021	272,269989	274,5	264,579987	272,51001	272,51001	1839100	0,001507
03/11/2021	271,529999	279,809998	269,980011	279,589996	279,589996	1041500	0,025981
04/11/2021	279,589996	280,619995	275,320007	280,410004	280,410004	949100	0,002933
05/11/2021	279,309998	284,589996	276,420013	278,679993	278,679993	833800	-0,00617
08/11/2021	279,51001	279,709991	268,269989	272,700012	272,700012	1151900	-0,02146
09/11/2021	272	274,690002	267	270,029999	270,029999	894700	-0,00979
10/11/2021	270,029999	273,920013	266,049988	266,929993	266,929993	708800	-0,01148
11/11/2021	266,619995	267,609985	264	266,570007	266,570007	637700	-0,00135
12/11/2021	270,670013	272,549988	267,519989	270,429993	270,429993	845000	0,01448
15/11/2021	273,820007	276,5	270,700012	271,820007	271,820007	756300	0,00514
16/11/2021	268,269989	268,720001	260,859985	261,549988	261,549988	1159500	-0,03778
17/11/2021	254,559998	261,410004	252,020004	258,380005	258,380005	1497000	-0,01212
18/11/2021	259,980011	260,730011	253,179993	256,790009	256,790009	975800	-0,00615
19/11/2021	257,709991	260,160004	254,570007	257,190002	257,190002	898800	0,001558
22/11/2021	257,970001	258,890015	250,669998	252,210007	252,210007	1290300	-0,01936
23/11/2021	252,070007	254,449997	249,520004	254,149994	254,149994	799100	0,007692
24/11/2021	253,179993	253,179993	247,660004	250,130005	250,130005	1579800	-0,01582
26/11/2021	250,779999	250,779999	242,020004	242,899994	242,899994	1300400	-0,02891
29/11/2021	245,360001	245,5	235,179993	236,110001	236,110001	2229100	-0,02795
30/11/2021	236,5	239,770004	228,679993	235,740005	235,740005	3294300	-0,00157
01/12/2021	236,979996	239,580002	228,880005	229,5	229,5	1672700	-0,02647
02/12/2021	228,550003	229,470001	224,460007	228,520004	228,520004	1276200	-0,00427
03/12/2021	227,690002	229,039993	221,720001	223,919998	223,919998	1427700	-0,02013
06/12/2021	223,199997	226,220001	222,149994	224,110001	224,110001	1101800	0,000849
07/12/2021	225,169998	228,800003	223,649994	226,830002	226,830002	941300	0,012137
08/12/2021	227,179993	235,220001	225,899994	234,720001	234,720001	1419100	0,034784
09/12/2021	232,860001	236,889999	230,809998	232,429993	232,429993	1365200	-0,00976
10/12/2021	232,800003	233,690002	229,520004	232,619995	232,619995	998800	0,000817
13/12/2021	231,679993	235,800003	230,179993	234,5	234,5	1236600	0,008082
14/12/2021	233,929993	236,630005	230,169998	230,759995	230,759995	1232500	-0,01595
15/12/2021	230,199997	236,369995	228,949997	235,880005	235,880005	1262400	0,022188
16/12/2021	237,289993	243,429993	234,860001	235,520004	235,520004	1252200	-0,00153
17/12/2021	233	239,899994	232,580002	237,429993	237,429993	2262900	0,00811
20/12/2021	239,75	240	234,25	236,960007	236,960007	1127700	-0,00198
21/12/2021	235,050003	237,600006	230,050003	234,649994	234,649994	1030200	-0,00975
22/12/2021	236,259995	236,479996	231,289993	234,479996	234,479996	783300	-0,00072
23/12/2021	232,949997	236,210007	232,039993	235,410004	235,410004	1003300	0,003966
27/12/2021	235,229996	236,699997	232,360001	234,190002	234,190002	1744600	-0,00518
28/12/2021	233,339996	236,960007	233,020004	235,990005	235,990005	775000	0,007686
29/12/2021	235	265,540009	234,130005	258,309998	258,309998	6869700	0,09458
30/12/2021	245,190002	247	237,050003	240	240	4423100	-0,07088
31/12/2021	239,759995	243,710007	239,5	239,919998	239,919998	1532700	-0,00033
03/01/2022	240,149994	247,509995	238,070007	244,139999	244,139999	1642200	0,017589
04/01/2022	245,130005	245,449997	239	241,729996	241,729996	1283400	-0,00987

05/01/2022	241,729996	249	239,179993	239,270004	239,270004	1167400	-0,01018
06/01/2022	240,300003	242,449997	236,850006	237,300003	237,300003	1036900	-0,00823
07/01/2022	235,550003	236,899994	231,619995	232,600006	232,600006	1394900	-0,01981
10/01/2022	232,75	235,550003	230,539993	235,309998	235,309998	1754000	0,011651
11/01/2022	235,399994	243,710007	235	241,520004	241,520004	1557700	0,026391
12/01/2022	223,100006	227,589996	217,100006	225,339996	225,339996	7511100	-0,06699
13/01/2022	225,300003	239,639999	225,300003	236,669998	236,669998	3781400	0,05028
14/01/2022	235,080002	239,470001	233,800003	239,300003	239,300003	1768000	0,011113
18/01/2022	238,899994	238,899994	231,369995	233,809998	233,809998	1631500	-0,02294
19/01/2022	235,509995	235,509995	230,649994	230,809998	230,809998	1258500	-0,01283
20/01/2022	231,279999	233,119995	225,619995	225,910004	225,910004	1471400	-0,02123
21/01/2022	225,369995	226,369995	220,289993	220,520004	220,520004	2205600	-0,02386
24/01/2022	220,220001	224,869995	214,880005	224,690002	224,690002	1995700	0,01891
25/01/2022	221,160004	224,910004	218,369995	222,309998	222,309998	1507200	-0,01059
26/01/2022	223,139999	226,880005	218,229996	219,600006	219,600006	1684500	-0,01219
27/01/2022	221,259995	223,740005	218,199997	218,940002	218,940002	1098000	-0,00301
28/01/2022	218,160004	225,229996	217,919998	225,210007	225,210007	1325600	0,028638
31/01/2022	223,029999	228,009995	221,880005	226	226	2518500	0,003508
01/02/2022	227,169998	231,220001	226,949997	229,369995	229,369995	1049600	0,014911
02/02/2022	228,669998	228,770004	222,270004	224,960007	224,960007	1083300	-0,01923
03/02/2022	215	223,139999	212,559998	220,169998	220,169998	2005000	-0,02129
04/02/2022	215,300003	223,100006	215,270004	221,529999	221,529999	1265800	0,006177
07/02/2022	220,740005	223,429993	219,389999	221,300003	221,300003	832600	-0,00104
08/02/2022	220,369995	223,380005	216,899994	222,389999	222,389999	991300	0,004925
09/02/2022	224,330002	228,529999	222,210007	226,809998	226,809998	989700	0,019875
10/02/2022	224,470001	226,970001	219,029999	220,039993	220,039993	1316000	-0,02985
11/02/2022	219,240005	221,580002	214,110001	214,589996	214,589996	1118600	-0,02477
14/02/2022	214,869995	215,369995	211,289993	214,119995	214,119995	872900	-0,00219
15/02/2022	214,009995	217,869995	214,009995	217,369995	217,369995	741500	0,015178
16/02/2022	216,729996	216,729996	213,389999	214,550003	214,550003	763800	-0,01297
17/02/2022	212,600006	214,139999	209,070007	210,600006	210,600006	1083600	-0,01841
18/02/2022	209,279999	211,5	207,610001	209,789993	209,789993	1053400	-0,00385
22/02/2022	208,309998	212,259995	208,309998	209,809998	209,809998	1254000	9,54E-05
23/02/2022	210,070007	211,550003	208,940002	209,080002	209,080002	964600	-0,00348
24/02/2022	204,860001	207,050003	200,360001	203,119995	203,119995	1883300	-0,02851
25/02/2022	204,490005	209,929993	203,880005	207,380005	207,380005	1035200	0,020973
28/02/2022	204,399994	211,169998	202,580002	211,009995	211,009995	1395300	0,017504
01/03/2022	210,580002	213,800003	209,410004	210,339996	210,339996	804400	-0,00318
02/03/2022	210,339996	211,059998	206,429993	207,789993	207,789993	1108400	-0,01212
03/03/2022	213,029999	213,710007	209,190002	211,229996	211,229996	942100	0,016555
04/03/2022	208,940002	211,360001	208,940002	209,449997	209,449997	708800	-0,00843
07/03/2022	208,229996	218,220001	205,009995	205,779999	205,779999	1309700	-0,01752
08/03/2022	201,300003	209,830002	201,009995	202,009995	202,009995	1407100	-0,01832
09/03/2022	206,139999	209,699997	201,490005	202,270004	202,270004	1236900	0,001287
10/03/2022	201	203,360001	194,940002	198,639999	198,639999	1166200	-0,01795
11/03/2022	201,130005	201,660004	197,25	197,669998	197,669998	787400	-0,00488
14/03/2022	198,589996	201,520004	192,669998	193,770004	193,770004	1475800	-0,01973

15/03/2022	193,210007	197,419998	193,089996	197,360001	197,360001	1306300	0,018527
16/03/2022	201,229996	204,25	198,059998	203,800003	203,800003	1075000	0,032631
17/03/2022	203,039993	206,600006	202,009995	205,320007	205,320007	1057100	0,007458
18/03/2022	204,389999	208,880005	203,070007	208,570007	208,570007	2102800	0,015829
21/03/2022	207,699997	209,029999	203,990005	206,809998	206,809998	1284400	-0,00844