EXHIBIT 3

Data Appendix

1. Monthly Contract Volume for Nasdaq-100 Index Options

Month	NDX-Mnthly	NDX-Wkly	NDXP-Fri	NDXP-Wed	NDXP-Mon	Total
Jan-17	139,700	133,205				272,905
Feb-17	144,694	115,223				259,917
Mar-17	142,107	206,815				348,922
Apr-17	131,687	147,201				278,888
May-17	172,564	152,245				324,809
Jun-17	199,901	223,416				423,317
Jul-17	147,320	161,954				309,274
Aug-17	180,687	187,422				368,109
Sep-17	125,941	167,403				293,344
Oct-17	146,237	176,517				322,754
Nov-17	201,339	193,066				394,405
Dec-17	112,437	184,830				297,267
Jan-18	154,927	136,218	82,070			373,215
Feb-18	163,633		157,034			320,667
Mar-18	139,291		121,852			261,143
Apr-18	138,029		108,311			246,340
May-18	127,430		86,639			214,069
Jun-18	194,212		117,506			311,718
Jul-18	154,115		159,011			313,126
Aug-18	150,637		168,655			319,292
Sep-18	127,983		137,979	10,379		276,341
Oct-18	190,744		220,268	107,387		518,399
Nov-18	159,292		93,179	48,422		300,893
Dec-18	129,194		52,405	30,723		212,322
Jan-19	103,978		54,745	35,016		193,739
Feb-19	85,368		50,414	36,272		172,054
Mar-19	79,237		66,030	38,775		184,042
Apr-19	83,113		70,953	63,793		217,859
May-19	110,776		97,535	76,123		284,434
Jun-19	130,374		88,764	62,609		281,747
Jul-19	99,112		83,313	75,016		257,441
Aug-19	108,752		107,798	71,763		288,313
Sep-19	90,656		82,338	76,476		249,470
Oct-19	97,353		68,397	62,955		228,705
Nov-19	66,046		68,058	58,464		192,568
Dec-19	73,272		79,842	72,372		225,486

Jan-20	104,347		100,756	82,672		287,775
Feb-20	113,992		87,604	84,148	1,673	287,417
Mar-20	131,844		53,230	26,963	20,706	232,743
Apr-20	67,646		43,388	35,870	23,399	170,303
May-20	66,657		53,052	42,542	31,729	193,980
Jun-20	71,555		62,242	46,074	36,886	216,757
Jul-20	106,985		93,223	45,197	43,921	289,326
Aug-20	90,382		87,188	77,468	63,032	318,070
Sep-20	83,074		80,906	42,607	30,860	237,447
Oct-20	82,780		66,163	39,242	37,790	225,975
Nov-20	77,404		42,100	35,987	33,351	188,842
Dec-20	84,224		65,143	56,981	44,333	250,681
Jan-21	85,210		78,079	62,545	55,673	281,507
Feb-21	97,260		102,223	54,676	60,538	314,697
Mar-21	109,387		125,297	84,975	68,900	388,559
Apr-21	90,802		131,657	106,241	79,628	408,328
May-21	117,372		149,655	89,715	91,269	448,011
Jun-21	110,217		134,175	119,222	95,576	459,190
Jul-21	117,856		225,935	172,242	152,883	668,916
Aug-21	117,166		169,904	165,038	158,842	610,950
Sep-21	133,378		211,845	188,268	127,592	661,083
Oct-21	140,666		231,210	157,178	133,515	662,569
Nov-21	148,447		224,041	151,522	132,543	656,553
Dec-21	127,531		182,517	136,747	94,052	540,847
Jan-22	147,503		159,186	108,553	118,390	533,632
Feb-22	119,717		109,037	69,597	66,554	364,905
Mar-22	166,320		116,456	111,071	72,612	466,459
Apr-22	142,402		218,438	157,163	92,625	610,628

2. Open Interest for Nasdaq-100 Index Options

Date	NDX-Mnthly	NDX-Wkly	NDXP-Fri	NDXP-Wed	NDXP-Mon	Total
1/31/2017	71,683	32,269				103,952
2/28/2017	79,258	32,794				112,052
3/31/2017	72,840	58,172				131,012
4/28/2017	64,966	52,134				117,100
5/31/2017	79,060	29,382				108,442
6/30/2017	92,494	56,323				148,817
7/31/2017	78,484	37,007				115,491
8/31/2017	95,889	52,256				148,145
9/29/2017	74,150	66,828				140,978

10/31/2017	87,815	54,559				142,374
11/30/2017	123,347	52,219				175,566
12/29/2017	48,265	58,681				106,946
1/31/2018	68,543		56,330			124,873
2/28/2018	73,287		30,879			104,166
3/29/2018	69,796		25,276			95,072
4/30/2018	76,090		16,791			92,881
5/31/2018	82,429		26,626			109,055
6/29/2018	113,834		37,446			151,280
7/31/2018	93,721		38,338			132,059
8/31/2018	106,741		47,646			154,387
9/28/2018	94,781		72,091	3,233		170,105
10/31/2018	107,545		42,707	18,199		168,451
11/30/2018	134,295		35,139	5,571		175,005
12/31/2018	75,729		12,515	8,275		96,519
1/31/2019	80,582		14,033	2,634		97,249
2/28/2019	88,482		12,366	3,574		104,422
3/29/2019	69,836		16,472	3,244		89,552
4/30/2019	77,819		12,708	13,278		103,805
5/31/2019	99,495		25,976	3,882		129,353
6/28/2019	78,865		37,785	5,694		122,344
7/31/2019	89,541		15,928	9,076		114,545
8/30/2019	92,796		17,501	8,270		118,567
9/30/2019	76,662		14,978	6,954		98,594
10/31/2019	78,771		13,735	3,507		96,013
11/29/2019	80,124		14,130	5,993		100,247
12/31/2019	54,888		13,726	10,643		79,257
1/31/2020	75,328		21,123	7,151		103,602
2/28/2020	94,164		21,224	5,984	2,927	124,299
3/31/2020	98,445		12,817	3,379	1,438	116,079
4/30/2020	86,271		11,252	1,498	1,233	100,254
5/29/2020	82,769		11,119	1,972	2,864	98,724
6/30/2020	70,000		7,490	4,379	1,735	83,604
7/31/2020	84,980		13,054	1,890	3,749	103,673
8/31/2020	100,590		9,494	6,537	7,867	124,488
9/30/2020	90,712		15,502	5,173	1,920	113,307
10/30/2020	101,004		13,985	2,114	3,982	121,085
11/30/2020	103,254		6,797	2,746	3,870	116,667
12/31/2020	77,794		15,543	3,592	4,204	101,133
1/29/2021	84,364		18,142	3,933	4,238	110,677
2/26/2021	89,026		32,149	3,314	9,767	134,256

3/31/2021	85,563		15,358	10,361	4,170	115,452
4/30/2021	89,978		24,488	4,345	6,442	125,253
5/28/2021	94,873		46,885	6,962	2,803	151,523
6/30/2021	90,005		18,241	25,754	7,683	141,683
7/30/2021	88,083		37,331	4,524	7,388	137,326
8/31/2021	98,219		23,194	15,504	1,740	138,657
9/30/2021	102,014		43,649	7,265	5,345	158,273
10/29/2021	110,713		40,831	7,363	10,610	169,517
11/30/2021	92,350		31,714	12,626	3,233	139,923
12/31/2021	71,240		32,757	5,719	6,928	116,644
1/31/2022	81,851		32,228	5,869	8,308	128,256
2/28/2022	81,278		15,947	4,666	7,929	109,820
3/31/2022	90,352		22,104	6,072	5,305	123,833
4/29/2022	101,070		51,364	6,855	8,739	168,028

3. Quoted Spread Regression for NDX-Mnthly:

Trends in quoted spreads were obtained using the following regression model to control for factors related to option characteristics but unrelated to the pilot

Spread = α + $InverseofPrice$ + Call/Put Dummy +Expiry + Moneyness Categories + Month Fixed Effect + ε

where Spread is the relative quoted spread. InverseofPrice is the inverse of the option price. Call/Put Dummy is a dummy variable that equals 1 for call options and 0 otherwise. Expiry is the number of the days to the expiration date. Moneyness is a dummy variable for moneyness category of each option. Specifically, we classify all option contracts into 5 moneyness categories. We calculate the moneyness for call options as $\frac{S-X}{X} * 100\%$ and that for put options as $\frac{X-S}{X} * 100\%$, where S is the stock price and X is the exercise price. The cut-offs for the five moneyness groups are -30%, -10%, 10% and 30%. Month Fixed Effect is a dummy variable for each month. The sample was drawn from the first trading date of each month. As the Option's NBBO data is not available between Aug 1, 2021 and Aug 11, 2021, we exclude August 2021 from the sample.

The coefficients for those month fixed effects are of our interest. The regression estimates are shown as follows:

Coefficient	Estimate	Std. Error	t value
Intercept	15.04	3.45	4.36
Dt: 2017-02-01	13.46	3.75	3.59
Dt: 2017-03-01	2.82	3.49	0.81
Dt: 2017-04-03	-11.68	4.31	-2.71
Dt: 2017-05-01	-1.72	4.58	-0.38
Dt: 2017-06-01	1.28	2.81	0.46
Dt: 2017-07-03	7.03	4.12	1.71
Dt: 2017-08-02	7.65	3.72	2.06
Dt: 2017-09-01	10.34	2.76	3.75
Dt: 2017-10-02	-5.98	4.39	-1.36
Dt: 2017-11-01	0.97	3.67	0.26
Dt: 2017-12-01	28.39	2.39	11.91
Dt: 2018-01-02	-2.67	4.51	-0.59
Dt: 2018-02-01	5.50	3.39	1.62
Dt: 2018-03-01	5.11	3.10	1.65
Dt: 2018-04-02	-18.42	4.16	-4.43
Dt: 2018-05-01	3.65	3.80	0.96
Dt: 2018-06-01	15.77	2.73	5.78
Dt: 2018-07-02	-10.13	4.09	-2.47
Dt: 2018-08-01	1.05	3.48	0.30
Dt: 2018-09-04	-6.99	3.82	-1.83
Dt: 2018-10-01	-14.93	4.06	-3.67
Dt: 2018-11-01	-3.50	3.10	-1.13
Dt: 2018-12-03	-14.93	4.00	-3.74
Dt: 2019-01-02	-23.28	3.35	-6.96
Dt: 2019-02-01	3.45	2.82	1.23
Dt: 2019-03-01	7.27	2.81	2.59
Dt: 2019-04-01	-19.96	3.95	-5.06
Dt: 2019-05-01	-9.83	3.39	-2.90
Dt: 2019-06-03	-23.25	3.87	-6.01
Dt: 2019-07-01	-25.37	3.95	-6.42
Dt: 2019-08-01	-11.47	3.03	-3.79
Dt: 2019-09-03	-21.62	3.55	-6.10
Dt: 2019-10-01	-20.48	3.62	-5.66
Dt: 2019-11-01	-9.90	2.95	-3.35
Dt: 2019-12-02	-23.34	3.82	-6.11
Dt: 2020-01-02	-14.06	3.02	-4.66
Dt: 2020-02-03	-30.70	3.96	-7.76

Dt: 2020-03-02	-15.58	3.77	-4.14
Dt: 2020-04-01	-14.33	3.15	-4.55
Dt: 2020-05-01	-16.47	2.67	-6.18
Dt: 2020-06-01	-43.64	4.05	-10.78
Dt: 2020-07-01	-27.88	3.27	-8.52
Dt: 2020-08-03	-41.91	3.92	-10.68
Dt: 2020-09-02	-14.27	3.21	-4.45
Dt: 2020-10-01	-13.23	2.87	-4.61
Dt: 2020-11-02	-36.07	3.76	-9.58
Dt: 2020-12-01	-26.30	3.39	-7.76
Dt: 2021-01-04	6.59	1.76	3.74
Dt: 2021-02-01	-37.25	3.82	-9.75
Dt: 2021-03-01	-32.12	3.79	-8.48
Dt: 2021-04-01	-17.27	2.78	-6.21
Dt: 2021-05-03	-31.37	3.82	-8.22
Dt: 2021-06-01	-25.24	3.32	-7.61
Dt: 2021-07-01	-15.38	2.72	-5.66
Dt: 2021-09-01	-34.40	3.02	-11.39
Dt: 2021-10-01	-24.34	2.41	-10.11
Dt: 2021-11-01	-57.25	3.73	-15.36
Dt: 2021-12-01	-25.52	3.05	-8.36
Dt: 2022-01-03	-41.48	3.68	-11.28
Dt: 2022-02-01	-42.78	3.36	-12.73
Dt: 2022-03-01	-43.49	3.36	-12.93
Dt: 2022-04-01	-23.19	2.07	-11.18
InverseofPrice	8.98	0.11	83.42
Call/Put Dummy	-4.85	0.49	-9.84
moneyness2	5.67	1.02	5.57
moneyness3	-68.18	0.91	-74.87
moneyness4	-78.43	1.06	-74.04
moneyness5	-54.00	0.80	-67.18
Expiry	4.98	0.38	13.25

The number of observations in the sample was 36,334 and the R-squared value was 0.513.

Trends in the observation date coefficients were shown in the report. The omitted date was from January 2017, thus having implicitly a value of zero.

Simple Average

The following table shows the average percent quoted spread for NDX-monthly contracts in each month.

	Simple Average
Dt: 2017-01-03	54.85
Dt: 2017-02-01	65.33
Dt: 2017-03-01	67.53
Dt: 2017-04-03	40.79
Dt: 2017-05-01	62.29
Dt: 2017-06-01	81.41
Dt: 2017-07-03	61.49
Dt: 2017-08-02	59.98
Dt: 2017-09-01	71.62
Dt: 2017-10-02	41.27
Dt: 2017-11-01	37.59
Dt: 2017-12-01	77.01
Dt: 2018-01-02	48.07
Dt: 2018-02-01	40.09
Dt: 2018-03-01	39.81
Dt: 2018-04-02	31.52
Dt: 2018-05-01	49.65
Dt: 2018-06-01	55.98
Dt: 2018-07-02	42.51
Dt: 2018-08-01	47.32
Dt: 2018-09-04	49.19
Dt: 2018-10-01	43.70
Dt: 2018-11-01	33.81
Dt: 2018-12-03	44.78
Dt: 2019-01-02	29.61
Dt: 2019-02-01	43.39
Dt: 2019-03-01	52.18
Dt: 2019-04-01	63.45
Dt: 2019-05-01	38.96
Dt: 2019-06-03	35.84
Dt: 2019-07-01	36.43
Dt: 2019-08-01	40.20
Dt: 2019-09-03	31.56
Dt: 2019-10-01	38.26
Dt: 2019-11-01	24.69
Dt: 2019-12-02	37.47
Dt: 2020-01-02	31.29
Dt: 2020-02-03	19.17
Dt: 2020-03-02	34.90
Dt: 2020-04-01	27.87

Dt: 2020-05-01	16.21
Dt: 2020-06-01	17.81
Dt: 2020-07-01	16.80
Dt: 2020-08-03	20.70
Dt: 2020-09-02	39.58
Dt: 2020-10-01	39.95
Dt: 2020-11-02	26.83
Dt: 2020-12-01	43.55
Dt: 2021-01-04	35.69
Dt: 2021-02-01	21.88
Dt: 2021-03-01	30.22
Dt: 2021-04-01	22.11
Dt: 2021-05-03	29.05
Dt: 2021-06-01	29.29
Dt: 2021-07-01	24.72
Dt: 2021-09-01	30.89
Dt: 2021-10-01	30.98
Dt: 2021-11-01	17.98
Dt: 2021-12-01	39.77
Dt: 2022-01-03	33.77
Dt: 2022-02-01	27.49
Dt: 2022-03-01	26.76
Dt: 2022-04-01	27.16

4. Quoted Spread Model for QQQ Monthly Options

The following table shows the average percent quoted spread for QQQ contracts in each month.

	Simple Average
Dt: 2017-01-03	53.38
Dt: 2017-02-01	59.45
Dt: 2017-03-01	53.63
Dt: 2017-04-03	54.68
Dt: 2017-05-01	61.36
Dt: 2017-06-01	61.01
Dt: 2017-07-03	57.03
Dt: 2017-08-02	58.60
Dt: 2017-09-01	66.36
Dt: 2017-10-02	59.66
Dt: 2017-11-01	45.31
Dt: 2017-12-01	55.44

Dt: 2018-01-02	58.88
Dt: 2018-02-01	37.65
Dt: 2018-03-01	31.13
Dt: 2018-04-02	28.61
Dt: 2018-05-01	42.98
Dt: 2018-06-01	45.30
Dt: 2018-07-02	27.21
Dt: 2018-08-01	37.91
Dt: 2018-09-04	37.88
Dt: 2018-10-01	37.07
Dt: 2018-11-01	23.16
Dt: 2018-12-03	38.78
Dt: 2019-01-02	42.01
Dt: 2019-02-01	48.89
Dt: 2019-03-01	55.06
Dt: 2019-04-01	44.73
Dt: 2019-05-01	39.27
Dt: 2019-06-03	38.40
Dt: 2019-07-01	31.83
Dt: 2019-08-01	37.03
Dt: 2019-09-03	33.27
Dt: 2019-10-01	47.70
Dt: 2019-11-01	58.58
Dt: 2019-12-02	31.78
Dt: 2020-01-02	46.65
Dt: 2020-02-03	38.04
Dt: 2020-03-02	38.07
Dt: 2020-04-01	34.52
Dt: 2020-05-01	21.50
Dt: 2020-06-01	25.29
Dt: 2020-07-01	20.30
Dt: 2020-08-03	23.55
Dt: 2020-09-02	39.90
Dt: 2020-10-01	26.38
Dt: 2020-11-02	10.48
Dt: 2020-12-01	28.35
Dt: 2021-01-04	46.53
Dt: 2021-02-01	15.36
Dt: 2021-03-01	37.09
Dt: 2021-04-01	22.78
Dt: 2021-05-03	20.92

Dt: 2021-06-01	26.80
Dt: 2021-07-01	19.95
Dt: 2021-09-01	29.52
Dt: 2021-10-01	32.77
Dt: 2021-11-01	32.43
Dt: 2021-12-01	28.71
Dt: 2022-01-03	32.88
Dt: 2022-02-01	26.41
Dt: 2022-03-01	18.13
Dt: 2022-04-01	26.69