

## Futures And Options In Equity Derivatives: Nse's Status Quo

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### ABSTRACT

Indian derivatives market now needs no introduction to global financial market. It was the year 2000 when derivatives market hit the Indian Financial Market and derivative instrument were first traded in derivative segment along with other financial instrument in spot market. It was wholeheartedly welcomed by Indian traders, investors, brokers and other financial institutions and in no time derivatives' turnover aligned to the cash/spot market's turnover. It took only couple of years for derivatives segment to supersede the cash market segment. According to a report of world Federation of Exchanges Forum in 2016 for every rupee of cash turnover, 15.6 rupee (notional value) of derivatives is traded. The derivatives to cash turnover in India is the world's second highest, after South Korea. This paper attempts to study the present status of F&O segment of equity derivatives of NSE. Also, growth and development of each variant of futures and options since their inception have been patterned and investigated. Data collected are purely secondary and taken from NSE's official website. Simple statistics like mean, coefficient of variation, CAGR, AGR and correlation has been used in excel to support the study. The study concludes that index option has witnessed the maximum growth followed by stock futures, stock options and index futures.

**Keywords:** NSE equity derivatives, F&O, INDX FUT, STK FUT, INDX OPT and STK OPT

### Introduction

According to the SEBI Annual report 2017-18, among the three derivatives trading platform NSE, BSE and MSEI, NSE is the unimously acknowledged leader. The NSE derivative segment offers derivatives trading in equities, currency, interest rates and commodity (recently launched on October, 2018). Notably, equity derivatives comprises the maximum with more than 70 % of total number of contracts standing in year 2017-2018. Although, equity derivatives includes futures, options, swaps, warrants and convertible bonds but futures and options are popular than others. The NSE equity derivative segment offers index futures, stock futures and index options and stock options. At the end of the of the year 2017-18 the NSE had 209 stocks for trading stock futures and stock options while the exchange permits 11 indices for trading index futures and 9 indicies are allowed for trading index options. NIFTY, NIFTY Midcap 50, BANKNIFTY, NIFTY INFRA, NIFTY IT, NIFTY PSE, NIFTY CPSE and India VIX consitutes the 8 domestic indicies while Dows Jones Index, S&P 500 and UK FTSE 100 index consitute the permitted global platform According to a discussion paper on "Growth and Development of Equity Derivatives Market in India" released by SEBI on July 13, 2017 between FY 2004-05 to FY 2016-17, the CAGR of turnover in cash market has been 11.39%, whereas the CAGR for turnover in equity derivatives has been 35.10%. The market capitalisation of listed companies has grown at 17.82% CAGR during this period. The ratio of notional turnover in equity derivatives to equity cash segment increased from 1.54 for FY 2004-05 to 15.59 for FY 2016-17. The report further discusses that NSE's equity derivatives turnover to GDP ratio has risen to 984.9% in 2017-18 from 618.8% in previous year. It adds that total turnover of equity derivatives in 2017-18 rose by 74.8% compared to 2016-17.



Figure (a): number of contracts as open interest. While considering the open interest, the report suggests that stock futures has the largest number of open interest at the end of the year 2017-18, followed by stock futures



Figure (b): number of traders in various classes .In context of various classes of derivatives trading member the report discusses that trading cum clearing members holds maximum share in total turnover with 39.4% (however, less than previous year 2016-17's share of 43.6%). Trading cum self clearing members holds the 2nd position with 37.2% of share in total turnover for the same year (it stood 35.5 % for 2016-17). It is then followed by trading members with 23.4% and professional clearing members with remaining share.

**Objectives of the Study**

1. To evaluate the overall growth and development of futures and options in NSE's Equity Derivative segment.
2. To study and make a comparative analysis of INDX FUT and STK FUT in futures segment.
3. To study and make a comparative analysis of INDX OPT and STK OPT in options segment.
4. To find out which variant of equity's F&O segment leads the market and evaluate the reasons for higher growth of the leader variant.

### Literature Review

Dhanaiah and Prasad in their study titled “Growth of India's derivatives market: An Analytical Study (2000-2015) reported that Indian derivative market have experienced tremendous shifts in the share of derivative products. They concluded that index options contributed largest share (71.80%) in total derivatives turnover in 2014-15. Considering certain reports they added NSE ranked 1st in single stock index option for the year 2015.

Kohli in her paper titled “Journey of equity derivatives market at NSE – An analysis for the decade (2000-01 to 2009-10) concluded that among four types of the products index and stock futures witnessed dwindling volumes in terms of turnover while index option experienced massive gains. 2008-09 the crucial year, remarked a huge fall in stock futures by 20% in share of total volume which got compensated by an equal rise in index option.

Barot and Gajjar in their paper titled “Role and growth of Financial Derivatives in Indian Capital Market” they stressed upon participant wise trading value in in NSE F&O segment for 2007-08 to 2011-12 namely, institutional investor, retail investors and proprietary investors of which they analyzed that proprietary investor had highest CAGR followed by institutional and retail investors.

In a working paper titled the development of equity derivatives market in emerging Asia by Andreas A. Jobst, he found that the explosive growth of the single stock futures market matches the four-fold increase of trading in equity index futures in India since 2003. He also added that most equity derivatives in Emerging Asia are exchange-traded (ETD), as opposed to foreign exchange and interest rate derivatives, which are mostly traded over-the-counter (OTC).

### Research Methodology

The data are purely secondary in nature and collected from NSE's official website ([www.nseindia.com](http://www.nseindia.com)). The data are taken for a period of 19 years from the year 2000 to 2018. But growth percentage and CAGR are calculated for 16 years, from 2001-02 to 2017-18 because only futures data are available in 2000-01(option trading was not started in 2000) and year 2018-19 has been excluded for incomplete data. The CAGR is calculated by given formula-  $[(\text{last year}/\text{initial year})^{1/\text{no.of years}-1}]$  using Excel and coefficient of variation is being computed by mean. AGR is computed in excel by using the formula  $(\text{last year's value}-\text{beginning year's value})/\text{beginning year's value}$ . AAGR is the average of AGR taken for 16 years.

### Data Analysis and Interpretation

Business growth of index futures, stock futures index options and stock option of NSE's equity derivatives have been tabulated in following tables. Charts showing average growth rate of each of the derivatives variants have been plotted by using the AGR tabulated in adjacent columns of respective variant.

Table 1 : Index Futures and Stock Futures

YEAR	INDXFUT	AGR INDXFUT	STK FUT	AGR STKFUT	TOTAL
2000-01	90580	0	0	0	90580
2001-02	1025588	0	1957856	0	2983444
2002-03	2126763	1.073701135	10676843	4.453334157	12803606
2003-04	17191668	7.083490262	32368842	2.031686614	49560510
2004-05	21635449	0.258484575	47043066	0.453344114	68678515
2005-06	58537886	1.705646922	80905493	0.719817603	139443379
2006-07	81487424	0.392045897	104955401	0.297259273	186442825
2007-08	156598579	0.921751496	203587952	0.939756793	360186531
2008-09	210428103	0.343742097	221577980	0.088364895	432006083
2009-10	178306889	-0.152646978	145591240	-0.342934528	323898129
2010-11	165023653	-0.074496482	186041459	0.277834154	351065112
2011-12	146188740	-0.114134627	158344617	-0.148874569	304533357
2012-13	96100385	-0.342627996	147711691	-0.067150537	243812076
2013-14	105252983	0.095239972	170414186	0.153694639	275667169
2014-15	129303044	0.228497666	237604741	0.394277945	366907785
2015-16	140538674	0.086893778	234243967	-0.014144389	374782641
2016-17	66535070	-0.526571099	173860130	-0.257781824	240395200
2017-18	57674584	-0.133170161	214758366	0.235236428	272432950
2018-19	34320347	-0.404931174	139861153	-0.348751084	174181500

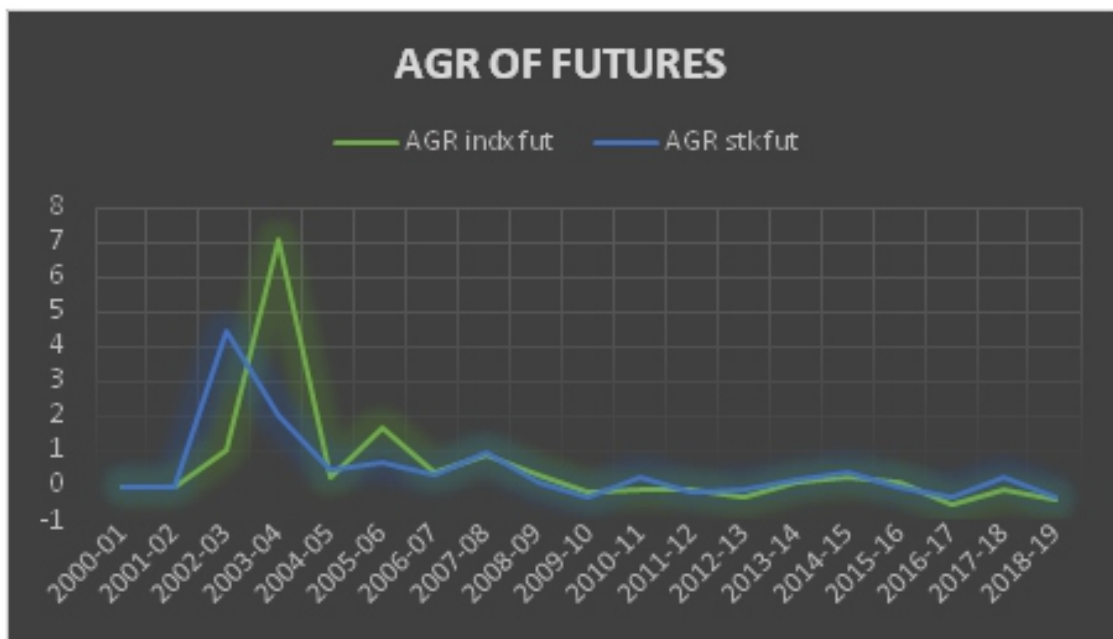
Source: NSE

Table 1 shows the year wise contracts of index and stock futures for a period of 19 years beginning from the year 2000-01 to 2018-2019. The table shows that index futures since its inception has risen at a good pace and has a growing trend till 2008-09, which was its apex year, after which it initiated falling for next 4 years till 2012-13. Although it rejuvenated in year 2013-14 and has a growing trend for 2 successive years, but it severely crashed after that. Similarly, stock futures also reflected an increasing trend till 2008-09, where after it drooped and but it bounced back in remaining years. It reached its maximum in 2014-15.

Figure 1.1: growth of index and stock futures



Figure 1.2: annual growth rate of index and stock futures



**Observations:**

- o Contracts traded in index futures out of total futures contracts contributed to 34.37% in the year 2001-02, it rose to 48.70% in 2008-09 and for the year 2017-18 it amounts to slug 26.85%.
- o Contracts traded in stock futures out of total futures contributed to 65.63 for the year 2001-02 while it was recorded 53.1% for 2008-09, it rose up to 73.15% for 2017-2018.
- o The average annual growth rate (AAGR) computed using yearly AGR stands 18.2% for index futures and 52.1% for stock futures.

The observation shows higher growth in stock futures than index futures, this fact holds true as investors finds building strategies with single stock relatively easier than with index futures as it is less likely that the hedging portfolio of an investor perfectly matches with the index chosen and its constituent.

**Table 2: Number Of Contracts In Index Option And Stock Option**

Year	INDX OPT	AGR INDX OPT	STKOPT	AGR STK OPT	TOTAL
2000-01	0	0	0	0	0
2001-02	175900	0	1037529	0	1213429
2002-03	442241	1.514161455	3523062	2.395627496	3965303
2003-04	1732414	2.917352756	5583071	0.584721189	7315485
2004-05	3293558	0.90113795	5045112	-0.09635539	8338670
2005-06	12935116	2.92739888	5240776	0.038782885	18175892
2006-07	25157438	0.944894657	5283310	0.008115974	30440748
2007-08	55366038	1.200782051	9460631	0.790663618	64826669
2008-09	212088444	2.830659582	13295970	0.405399915	225384414
2009-10	341379523	0.609609258	14016270	0.05417431	355395793
2010-11	650638557	0.905909737	32508393	1.319332676	683146950
2011-12	864017736	0.32795348	36494371	0.122613812	900512107
2012-13	820877149	-0.04993021	66778193	0.829821728	887655342
2013-14	928565175	0.131186532	80174431	0.200607974	1008739606
2014-15	1378642863	0.484702313	91479209	0.141002285	1470122072
2015-16	1623528486	0.177628035	100299174	0.096414968	1723827660
2016-17	1067244916	0.342638626	92106012	0.08168723	1159350928
2017-18	1515034222	0.419575019	126411376	0.37245521	1641445598
2018-19	1104838417	0.270750191	98919706	-0.21747782	1203758123

Source: NSE

The above table shows a yearly number of contracts in index options and stock options, and their total volume for 19 years beginning from 2000-01 to 2018-19. The table shows both index and stock option started trading in 2001. Index option reflects growth throughout a decade. It got crashed in 2012-13 but soon it climbed new heights and reached its maximum in 2015-16. The stock option initially, indicated greater share in total proportion but gradually its share declined.

Figure2.1: growth of stock options and index options

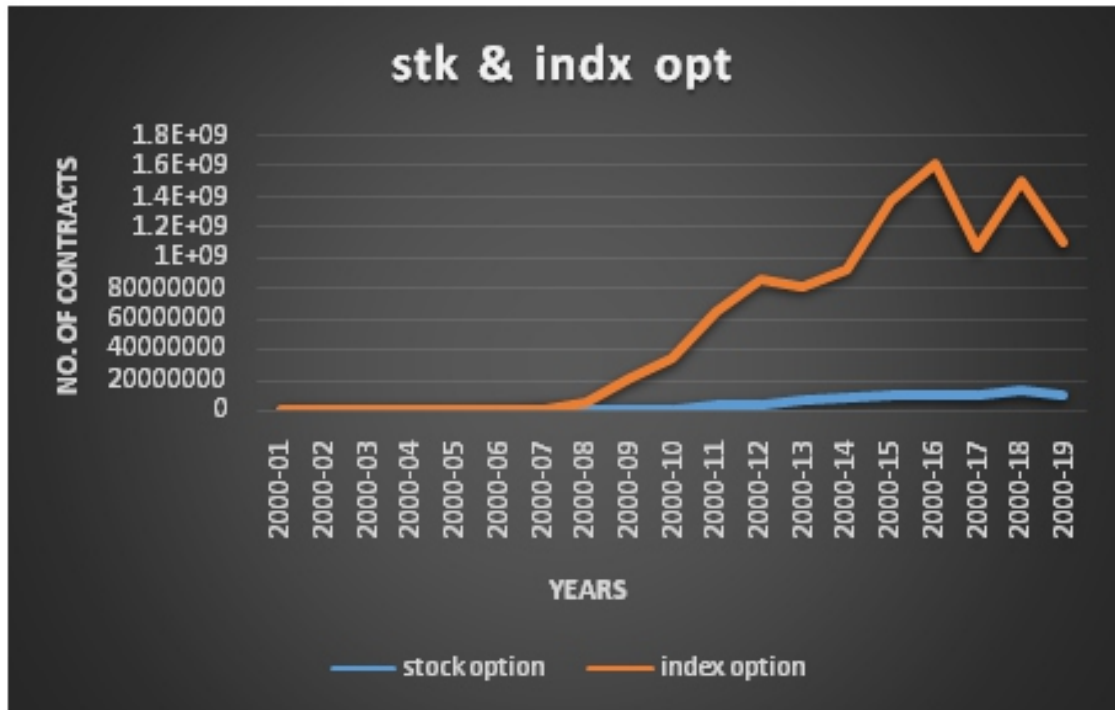


Figure2.2 annual growth rate of stock options and index options

**Observations:**

- o The index option initially in 2001-02 contributed to 14.49% of total options contracts, but it plunged to 92.29% for the year 2017-18.
- o The stock option contributed to 85.50% in 2001-02 of the total options contracts, but it dropped down to 7.70% for the year 2017-18
- o The average annual growth rate (AAGR) computed through AGR stands 91.9% for index options and 40.9% for the stock options.

Higher growth in index option than stock option can be theoretically justified with the amount of risk involved in these contracts. Indices usually get less affected by information travelling in the market as compared to a single stock hence, are less volatile. Practically, its superiority lies in the fact of lower bid-ask spread opportunity to traders. A good number of contract can be seen trading even on the day of expiry of an index option contract but this is not the case with stock options.

**Table 3: Number Of Contracts In Total Futures And Total Options**

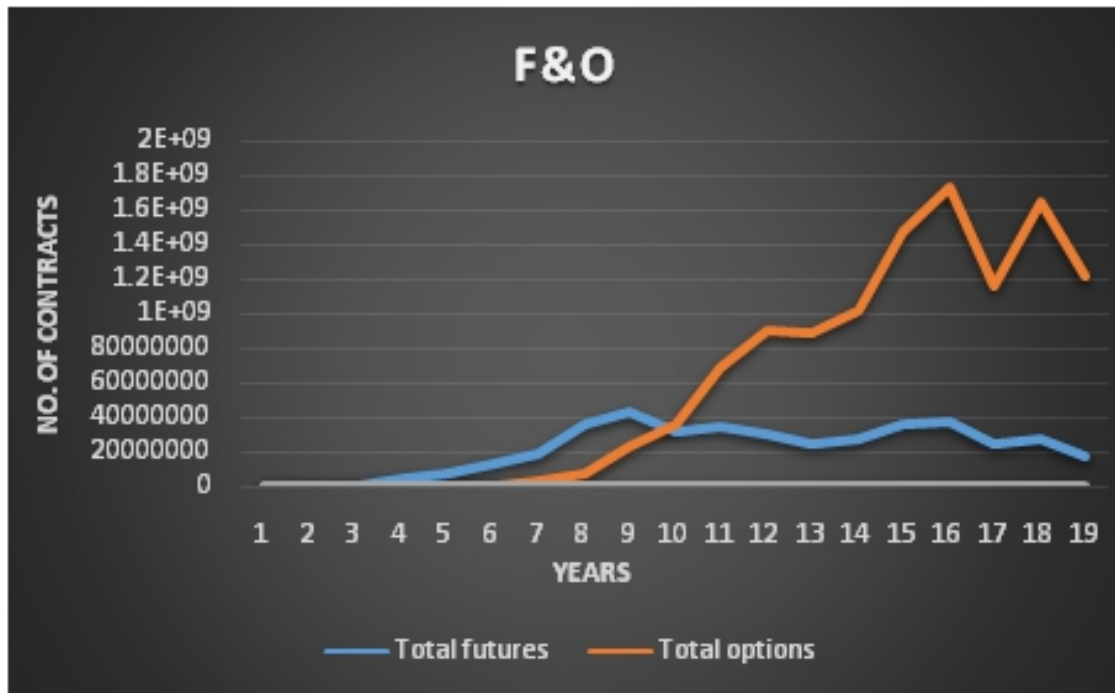
<b>YEAR</b>	<b>TOTAL FUTURES</b>	<b>TOTAL OPTIONS</b>	<b>TOTAL</b>
<b>2000-01</b>	90580	0	90580
<b>2001-02</b>	2983444	1213429	4196873
<b>2002-03</b>	12803606	3965303	16768909
<b>2003-04</b>	49560510	7315485	56875995
<b>2004-05</b>	68678515	8338670	77017185
<b>2005-06</b>	139443379	18175892	157619271
<b>2006-07</b>	186442825	30440748	216883573
<b>2007-08</b>	360186531	64826669	425013200
<b>2008-09</b>	432006083	225384414	657390497
<b>2009-10</b>	323898129	355395793	679293922
<b>2010-11</b>	351065112	683146950	1034212062
<b>2011-12</b>	304533357	900512107	1205045464
<b>2012-13</b>	243812076	887655342	1131467418
<b>2013-14</b>	275667169	1008739606	1284406775
<b>2014-15</b>	366907785	1470122072	1837029857
<b>2015-16</b>	374782641	1723827660	2098610301
<b>2016-17</b>	240395200	1159350928	1399746128
<b>2017-18</b>	272432950	1641445598	1913878548
<b>2018-19</b>	174181500	1203758123	1377939623

Source: NSE

Table 3 shows total number of contracts in equity futures and options for a period beginning from 2000-01 to 2018-2019. Trading in futures started in 2000-01 (12th June 2000 index futures were launched). It was then followed by stock futures on 9th November 2001. Both of which when taken together for the study, depicts, total futures are traded heavily on the exchange. The table shows that trading in total futures had a great pace and higher volume than total options trading till the year 2009-10. Although futures trading is still growing and enhancing but with a lower magnitude when compared to options trading. Options were introduced with index option on 4th June 2001 and were followed by options in securities on 9th July 2001. Options trading also had a great start and is still growing with leaps and bounds. It reflected tremendous growth since its beginning and surpassed futures total volume of contract in 2009-10. It has an increasing trend after 2009-10 till now (2018-2019) but the year 2016-2017 stands exception to the trend and quotes the year with a remarkable decline.



Figure3: growth of total futures and total options



**Observations:**

- o Total futures which stood 71.08% of the total contracts traded in 2001-02 has now been squeezed to 16.59% of the total contract traded in equity FNO segment in the year 2017-18. Consequently, volume of option contract in 2001-02 recorded 28.91% of total contract which rose up to 85.76% for year 2017-18.
- o The mean value of total futures contract for 17 years (2001-02 to 2017-18) stands 235623489 while that of total options contract stands 599403333.

Similarly, while measuring dispersion in respective columns, coefficient of variation stood 57.87% and 104.92% for total futures and total options respectively.

CAGR	TOTAL FUTURES	TOTAL OPTIONS
16 YEAR	4.70 %	83.54 %

According to SEBI's discussion paper on growth and development of equity derivative market in India (2016-17) higher growth in options market have been justified on the following grounds:

- a. Securities Transaction Tax levied on options are on the amount of option premium calculated while it is on the entire notional value of the contract of futures contract which computes for STT calculation which would be relatively higher.
- b. Trading in options enable market participant's to deploy various trading strategies to earn upfront premium that may be used to off-set losses or enhance gains in their trading position in futures or in cash market.

**Table 4: Number Of Contracts In Index Futures, Stock Futures, Index Option And Stock Option**

<b>YEAR</b>	<b>INDX FUT</b>	<b>STK FUT</b>	<b>INDX OPT</b>	<b>STK OPT</b>	<b>TOTAL</b>
<b>2018-19</b>	34320347	139861153	1104838417	98919706	1377939623
<b>2017-18</b>	57674584	214758366	1515034222	126411376	1913878548
<b>2016-17</b>	66535070	173860130	1067244916	92106012	1399746129
<b>2015-16</b>	140538674	234243967	1623528486	100299174	2098610395
<b>2014-15</b>	129303044	237604741	1378642863	91479209	1837041131
<b>2013-14</b>	105252983	170414186	928565175	80174431	1284424321
<b>2012-13</b>	96100385	147711691	820877149	66778193	1131467418
<b>2011-12</b>	146188740	158344617	864017736	36494371	1205045464
<b>2010-11</b>	165023653	186041459	650638557	32508393	1034212062
<b>2009-10</b>	178306889	145591240	341379523	14016270	679293922
<b>2008-09</b>	210428103	221577980	212088444	13295970	657390497
<b>2007-08</b>	156598579	203587952	55366038	9460631	425013200
<b>2006-07</b>	81487424	104955401	25157438	5283310	216883573
<b>2005-06</b>	58537886	80905493	12935116	5240776	157619271
<b>2004-05</b>	21635449	47043066	3293558	5045112	77017185
<b>2003-04</b>	17191668	32368842	1732414	5583071	56886776
<b>2002-03</b>	2126763	10676843	442241	3523062	16768909
<b>2001-02</b>	1025588	1957856	175900	1037529	4196873
<b>2000-01</b>	90580	-	-	-	90580

Source: NSE

The above table indicates a compilation of index futures, stock futures, index option and stock option taken for a period of 19 years beginning from the period of 2000-01 to 2018-19. The stock futures shows an increasing trend since beginning (2001) till 2008-09. It stepped down in 2009-10 and is found unstable after that. Similarly, index futures also reflects a growing trend till 2008-09 after which it is found quite volatile. Considering options, index option has shown an increasing trend throughout the two decades except for the year 2012-13 and 2016-17. While, stock options have only one exceptional year 2016-17 which marks a downfall in its increasing trend.

Figure 4: growth of index futures, stock futures, index option and stock option



**Observations:**

- o Number of contracts traded in index futures in the year 2001-2002 is 24.44% of the total contract and it dropped down to 3.01% in the year 2017-2018
- o Number of contracts traded in stock futures in the year 2001-2002 stands 46.65% of the total contracts and it dragged down to 11.22% for the year 2017-2018
- o Number of contracts traded in index option traded in 2001-2002 was 4.19% of the total contract but it plunged to 79.16% of the total number of contracts in the year 2017-2018.
- o Number of contracts traded in stock option in 2001-2002 is 24.72% but it rolled down to 6.60% in the year 2017-2018
- o Mean computed for index futures stands as 96115028.4 and that for stock futures as 139508461.
- o Mean computed for index option and stock option stands as 558889398.6 and 40513934.71 respectively.
- o The coefficient of variation is calculated as 67.59% for index futures while 56.67% for stock futures.

The coefficient of variation is calculated as 105.21% for index option while 104.81% for stock option

CAGR	INDEX FUTURES	STOCK FUTURES	INDEX OPTION	STOCK OPTION
16 YEARS	2.51%	5.85%	537.31%	6.61%

**Reasons for Higher Growth in Options than Futures****v Limited downside risk:**

It is an inherent feature of option which makes it stand differently among all the equity derivative instruments. Options buyers are exposed only to the amount of the premium paid by them to the seller. Their downside risk is limited up to the premium invested, the worst that can take place in case the options trader's prediction goes totally wrong is that the option will expire worthless. But in case of a futures contract the futures buyer has no such privilege.

**v No margin call:**

In a futures contract apart from the initial margin, traders are obliged to top up their balances in case of a margin call to settle the contract daily. Daily movement of the underlying has no effect on an options trader's portfolio as they are not required to make up for margin calls for daily losses.

**v Greater holding power:**

In case a futures trader is not able to make up for the margin calls his contract is liquidated automatically and he remains liable to the broker for any balance due. But, as said above, options traders are not asked for any top up for daily settlement, their contract does not get liquidated by the exchange. Hence, an option trader has a greater holding power which can be understood as greater time value. Contracts having greater time value (holding value) have a greater probability of expiring in one's predicted direction.

**v Can alter directional bias:**

An options trader can change his directional position without actually closing his existing positions. For ex. a call option trader (bullish trader) can purchase a put option without actually closing his call position on the same underlying in case he feels the market is turning bearish. By doing so he can transform his position into a delta neutral position. The futures contract lacks this feature.

**v Availability of different option strategies:**

Availability of option strategies makes options more lucrative than futures as an options trader can take positions which suit him best.

**Reasons for Higher Growth in Index Option than Stock Option****v Risk diversification:**

Trading a single stock is more risky than trading in indices. A small movement in the underlying stocks' price will have a big impact on a trader's portfolio. It is not that indices including those moving stocks would not have an effect on them but their magnitude would certainly be low as compared to concerned stocks. The risk involved in trading is diversified among several stocks of the chosen indices and hence it is safer to trade in index options than stock options.

**v No physical delivery:**

Index options are traded on the notional value of the indices and are settled in cash, unlike most stock options where the contract is physically settled at/before maturation of the contract.

v **European vs American style:**

Generally, index options are of European style while stock options are of American style. Index options being European are simple to deal. Its pricing calculation is not as complex as of American style stocks.

v **Number of strikes:**

NIFTY options are heavily traded and have many strikes (sometimes more than 80) apparently with good volume at any point in time but this luxury is not available with stock options. First of all, only a few stock option is traded among the available stocks and among them, only immediate strikes have moderate volume.

v **Chances of illiquidity:**

NIFTY's index spread is lower if compared to major stock options.

**Conclusion**

It is evident from the above charts and table that although option trading started after futures trading in NSE equity FNO segment, options trading superseded futures trading in manifolds. The most likely reason for this would be the limited risk involved in options trading as compared to futures trading. Particularly, in options, it is the index option which is traded more compared to a stock option. Number of contracts in total futures exceeded total options contracts till 2008-09. Later, the volume of option contract outshined total futures contract in 2009 and it still outperforms the total futures market. The options market is found 6 times bigger than the futures market in 2017-18. It amounts to 85.76% of total contracts for 2017-18. The calculated average annual growth rate (AAGR 0.65%) and compound annual growth rate (CAGR 83.54) exhibits higher growth in overall options than futures. But studying the coefficient of variation it is evident that variation in total futures (57.87%) is less compared to total options (104.92%). Specifically, in futures, stock futures lead the segment. It accounts for 73.15% of total futures in 2017-18 which is almost 4 times the index futures' volume. AAGR (0.521%) and CAGR (5.85) of stock futures shows speedy growth in stock futures than index futures. Also, volatility in stock futures' volume (56.67) is less compared to index futures (67.59). Particularly in options, index option dominates the segment. It acquires 92.29% of total options in 2017-18. The index option market is found 11.92 times larger than stock option market. The computed AAGR (0.919) and CAGR (537.15) of index option is much higher than the stock option. The coefficient of variation differs slightly in both the variants of options mentioned. Lastly, in total FNO segment index option outperforms other equity derivatives choices. It sums up to 79.16% of total FNO volume for 2017-18. It is then followed by stock futures with 11.22%, stock option with 6.60% and then by index futures with 3.01% for the same year.

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