ESOP VISTAS

Covid-19 induced volatility: A study to understand its impact on fair value of ESOP

Background

In the month of March 2020, financial markets across the world witnessed unprecedented volatility in asset prices. The sudden spread of the Coronavirus (Covid-19) in the developed world caught everyone off guard. Investors turned away from risky assets (equities, corporate bonds, etc.) to safe heavens (gold, treasury, etc.) leading to indiscriminate selling in Indian stock markets. The "sell first, ask later" phenomenon led to elevated levels of volatility during the month of March 2020.

Governments, central banks, businesses and economists struggle to measure the economic impact from the Covid-19 pandemic. Corporations are readjusting their business models to adapt to the post Covid-19 environment. The curtailed operations during the lockdown and slow recovery after staggered relaxation will impact business profitability. Companies are exploring ways to control costs, especially fixed costs.

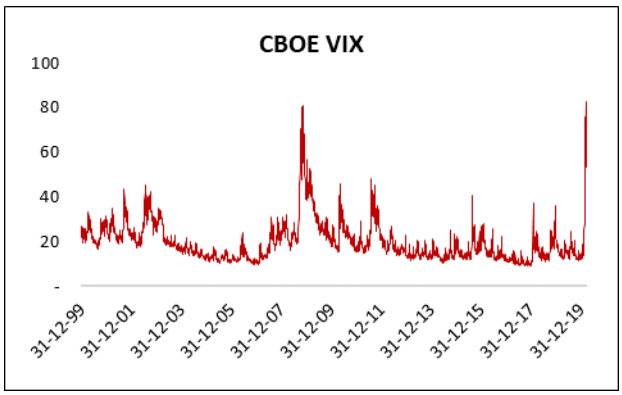
Compensation cost is one such avenue that is being relooked and rejigged. Stock based compensation (non-cash component) is also under review. The fair value of options granted to employees is influenced by internal factors like exercise price, expected life and dividend, as well as external factors like interest rate and volatility.

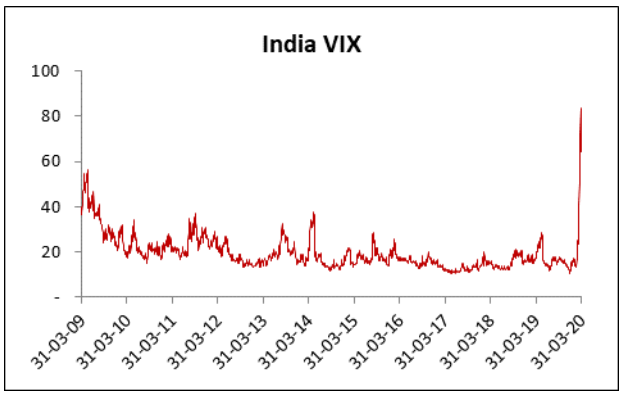
In this Newsletter, we are trying to analyze the impact of volatile stock prices on fair value of Employee Stock Options (ESOPs).

Volatility

Volatility measures the frequency and magnitude of price movements, both up and down, that a financial asset experiences over a certain period of time. The more dramatic the price swings, the higher the level of volatility. The CBOE Volatility Index (VIX) is constructed using implied volatilities of a wide range of S&P 500 index options (both calls and puts). India VIX is a volatility index based on the NIFTY Index Option prices.

The value of VIX represents an unexpected annualized change over the next 30 days. VIX > 30 implies large amount of volatility as a result of investor fear or uncertainty, while VIX < 20 implies stable period in the marketplace. CBOE VIX jumped to 80 in mid-March, a level last seen during the 2008 global financial crisis. India VIX also hit 80 amidst meltdown driven by panic selling





Source: Yahoo! Finance; NSE

Fair value of options (black-scholes model)

The Black-Scholes model considers the following factors for calculating the fair value of options:

a) Exercise price of the option

b) Life of the option

c) Current price of the underlying shares

d) Expected volatility of the share price

e) Dividends expected on the shares

f) Risk-free rate for the life of the option

Volatility is one of the most important variables in the Black-Scholes model for determining the fair value of options. Expected volatility is a measure of the amount by which a price is expected to fluctuate during a period. The measure of volatility used in option pricing models is the annualised standard deviation of the continuously compounded rates of return on the share over a period of time.

For estimating the expected volatility, we consider historical volatility of the share price over the most recent period that generally commensurate with the expected life of the option.

Clause (d) of Para B25 of Ind AS 102 requires us to consider the tendency of volatility to revert to its mean i.e. its long-term average level, and other factors indicating that expected future volatility might differ from past volatility. The standard mentions example of failed takeover bid or major restructuring, resulting in extraordinary volatility in entity's share price for an identifiable period of time that could be disregarded in computing historical average annual volatility.

ASC 718-10-55-37 mentions that if an entity's share price was extremely volatile for an identifiable period of time, for instance, due to a general market decline, the entity might place less weight on its volatility during that period of time because of possible mean reversion.

Our Analysis

We have tried to analyze the impact of volatility on fair value of options. We selected five listed companies in India from different sectors for this analysis.

We have estimated the fair value of options for these listed entities with following assumptions

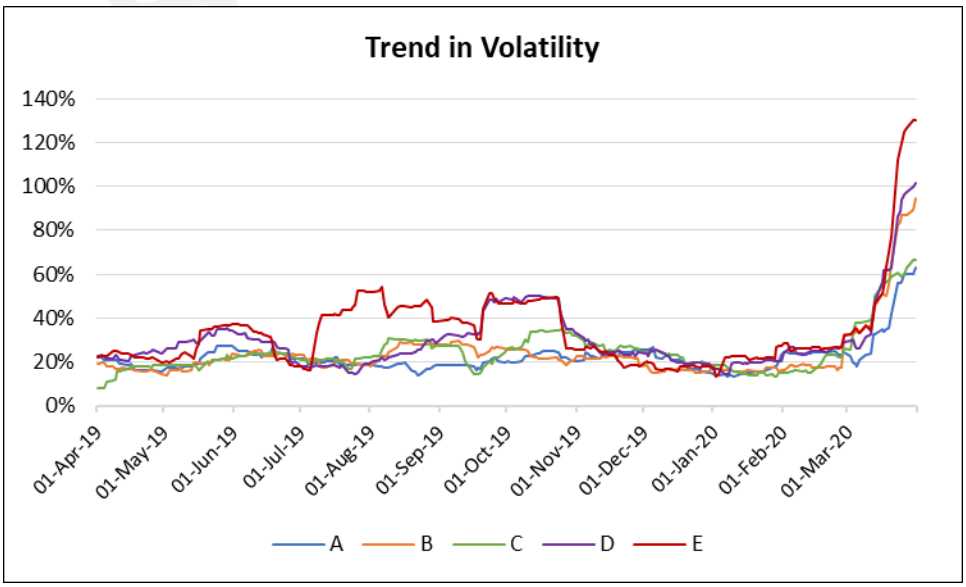
Grant Date	**April 1, 2020**
Market Price	Close Price of March 31, 2020
Exercise Price	Market Price
Expected Life	1 Year
Risk-free Rate	4.58%
Dividend Yield	0.00%
Volatility*	April 2019 – March 2020

**To understand the impact of abnormal volatility, we also calculated the fair value of options excluding the share prices in the month of March 2020 for volatility calculation while keeping all other inputs constant.*

The fair value of options "with and without" March 2020 share price volatility is tabled below

	Sector	FV of Option (Including March Volatility)	FV of Option (Excluding March Volatility)	Impact of March Volatility (% Chg in FV)
Company A	FMCG	57.95	46.87	-19.1%
Company B	IT	89.46	62.95	-29.6%
Company C	Pharma	58.36	48.89	-16.2%
Company D	Bank	59.22	43.30	-26.9%
Company E	NBFC	493.33	335.56	-32.0%

The chart shows trend in 30-day volatility in the last 12 months for these companies



Observations

- **The volatility in share prices in the month of March 2020 indeed has an impact on fair value of options. However, this impact varies with companies in different sectors.**
- **The broader indices were volatile throughout the month of March as evidenced by CBOE VIX for S&P 500 Index and India VIX for Nifty 50 Index. A similar spike in volatility was last witnessed during the 2008-09 global financial crisis. However, the Covid-19 induced volatility in March 2020 was much steeper and sharper compared to previous bouts of volatility.**
- **Fair value of options has a direct/positive correlation with volatility. However, the magnitude of change in fair value due to change in volatility varies from company to company. In this table, we summarize the sensitivity of fair value of options to 5% (500 bps) change in volatility.**

Company A	Company B	Company C	Company D	Company E
14.8%	12.0%	13.8%	10.3%	8.4%

- **Volatility risk can be mitigated if the company issues restricted stock units (RSUs) at face value instead of ESOPs. The fair value of these RSUs will be close to intrinsic value. These RSUs will be deep in-the-money and are able to negate the effects of volatility risk, interest rate risk and time to maturity.**

Conclusion

The Covid-19 pandemic resulted in unprecedented volatility in the month of March 2020 as evidenced by CBOE VIX and India VIX. The extraordinarily high volatility during this identifiable period has significant impact on the fair value of options. The effect of extraordinary volatility in share prices should be considered on case-to-case basis. If the difference between volatility "with and without" the identifiable period is more than 20%, we can consider disregarding the identifiable period in computing historical average annual volatility.