An Analysis of the Effectiveness of Index ETFS and Index Derivatives in Covered Call Strategy

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Abstract
One of the most efficient methods of managing risk and creating extra income is the covered call technique. Holding the underlying asset while writing a call option on it constitutes the approach. If properly implemented, the method can be a useful instrument for generating money. The efficiency of using Nifty 50 Index ETFs and Index derivatives as the legs of a covered call strategy is examined in the study. The plan would aid in producing a steady cash flow in the portfolio, generating wealth. The paper back-tests the covered call strategy with the primary goal of determining the technique's viability. The study's findings could be used to find a powerful instrument for wealth generation.
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JEL Classification: G11, G12, G13, G17

Introduction

This document presents the findings of a study conducted to ascertain how a covered-call strategy would affect a balanced portfolio's risk-return profile in relation to the Indian capital market.The requirement for proof on the effects of covered call strategies using ETF options on the risk-return characteristics of a balanced portfolio served as the driving force behind the study. There are no such studies on the effectiveness of covered call strategies for well-balanced portfolios in India. Furthermore, traders find covered call methods appealing since the premiums they collect yield a consistent income. The analysis undertaken in this study's conclusions mainly concur with earlier studies on the effectiveness of covered call strategies utilizing index options.

 (Compton, 2000)considerthepastreturnsforcoveredcallsusingall types of options traded on the Chicago Board and Options Exchange over the period 1986- 1989. The results of the study showed that the covered call approach underperformed in terms of returns during periods of bull market. However, the covered call approach resulted in lower risk compared to the underlyingstocks.

 (Whaley, 2002) Study by analyzing the profitability of a buy-write strategy involving buying a portfolio underlying the S&P/ASX200 and simultaneously writing just out-of-the-money S&P/ASX200 index call options over the period 1987 to 2002. The results of this study also show that the buy-write strategy produces higher average returns and lower risk than the investment on the index.

(Hill, 2006) Consider the performance of covered calls strategy using S&P 500 index options over the period 1990- 2002. They accomplish that such this strategy can outperform the index during periods of moderate or negative equity returns.

(Misra, 2007)The study aims at analyzing the return and risk characteristics of covered call and protective puts portfolios based on NSE Nifty index and to find out the factors responsible for the variation in returns on covered call and protective put portfolios.

(Fischer, 2012) The investment strategy is considered by investment practitioners and sophisticated retail investors to be fairly simple, flexible and low-risk, accounting for the majority of call options.

Literature Review

In previous literature, covered-call strategies (CC), also called "buy-write" strategies have historically posted promisingly strong performance, based on historical empirical analyses(Whaley, 2002)(Feldman, 2005); (Hill, 2006), despite the theoretical frameworks which contradict such strong performance ((Rendleman, 2001);(Shefrin, 1993) evaluated covered-calls from a prospect theory standpoint, and found that this strategy would be most beneficial for individuals that are highly risk (loss) averse. Recently, (Brooks, 2019) found that the "superior performance" of the covered call strategy on the S&P500 are "spurious" as they ignore or dismiss skewness.

Another strategy employed to protect against downside market risk is to buy put options on the stock index, which increase in value when the index decreases. Aggarwal and Gupta (2013) examined both covered-call and protective put strategies for India's CNX Nifty index. They found that both strategies could outperform the benchmark on a risk-adjusted basis.

Popular anomalies such as momentum investing (Jegadeesh, 1993), end-of-the-week/month/year/holiday effects (French, 1980);(Gibbons, 1981); (Keim, 1983); (Ariel, 1987); have either diminished or disappeared in recent years (Dolvin, 2017); (Robins)(Robins R. P., 2016); (Robins R. P., On unmodeled breaks in the turn of the year, turn of the month, and january effects., 2017); (Robins R. P., On Structural Changes in the Holiday Effect., 2019). Thus, we believe that it's worthwhile to revisit these strategies with more recent data in order to determine their efficacy over time.

We evaluate the overall utility of various covered call strategies for loss averse investors, using the prospect theory utility function (Kahneman, 1979). Here, we find that out-of-the-money call options yield the highest utilities for investors with less than average loss aversion, while in-the-money covered call options become optimal as loss aversion increases.

Objectives and Scope of Research

ETFs can be a good tool for investmentto anindividual. The research aims to study whether the performance of ETFs can be improved using option writing. The option writing is one of the trading strategies used for cash generation and as well as hedging investments. The research aims to apply covered call strategy with combination of ETFs and index call options and measure change in risk and return of ETFs. The research however is restricted to measuring the improvement in the performance of ETFs only hence the performance is measured objectively. The performance of portfolio is not compared with that of NIFTY or any other strategy. Similarly, only covered call strategy is used for the study, any other strategy which may be effective is not used for this research.

Research Methodology

The research was aimed at measuring the outcome of covered call portfolio consisting of ETF and Index options, for this purpose the back-testing method was used to measure the outcomes. The period of observation was from Feb 2019 to March 2023 consisting of 158 weekly trades.

The portfolios were constructed using weekly call options with NIFTY 50 as underlying. The outcome of portfolio was measured by taking position on different strike levels of call options from "At the Money" (ATM) options to "Out of Money (OTM)" options. The Nifty call options are available at Strike interval of 50 points. The call option which are 50 points abovethe ATM calls are labeled as OTM 1 calls. The research used call options up to level of OTM 7.

The second part of the portfolio was Equity ETFs. There were 98 ETFs listed in Indian markets tracking various indexes. The study was based on NIFTY call options, hence, only those ETFs were considered which were tracking NIFTY 50 ETFs. The research used total 11 different ETFs tracking Nifty 50 indexes to construct portfolio.

The total investment in portfolio was Rs. 100,000 of which Rs.30,000 was to be held in cash in accordance to margin rules of SEBI, the balance amount is to be held in ETFs.

The performance of the portfolio was measured on various parameters. The portfolio strategy was to enter in to position on Friday and exit on expiry which is on Thursday of next week. The first part of performance measurement was in absolute rupee terms. The net profit or loss in Rupee terms were calculated for every weekly trade for the portfolios and only ETFs. The performance was compared by calculating average profit or loss for both options and standard deviation of rupee gains. The second part of performance measurement was in form of percentage return on investment, the return on portfolio was measured on total investment of portfolio and same was compared with return on ETFs calculated on ETF investments only. The performance compared using percentage return and standard deviation of portfolio and ETFs. The portfolio performance was also measured in form of rate of success. The rate of success refers percentage of trade having positive outcome or net profits. The rate of success of portfolio was compared with rate of success of ETFs.

The significance of difference in portfolio performance to that of ETF performance is measured by applying paired t-test, while the difference in performance based on choice of ETFs or levels of call strike price is measured by applying one-way ANOVA.

Discussion on Results

Analysis of Returns

The data compared the return of the investment in ETF and Portfolio of ETF combined with covered call. The average weekly return in Rupee terms was calculated to test the effectiveness of call writing in improving return of ETFs. The average return on ETFs was Rs. 364.14 whereas the average return of covered call portfolio was Rs. 205.76. The returns were different when compared on the basis of choice of ETFs and Level of Calls

Table 1 Table Comparing Return of ETFs and Portfolio, based on choice of ETFs

	Weekly Return in Rupee Terms			Weekly Return in % of Investment		
ETF	**Average return of ETF in Rs.**	**Average return of Portfolio in Rs.**	**% Excess Return in Rupees term**	**Average return of ETF in %**	**Average return of Portfolio in %**	**Excess Average Return in %**
SBIETF	355.09	196.70	-44.60%	0.41%	0.20%	-52.13%
AXISETF	213.45	55.06	-74.20%	0.25%	0.05%	-78.50%
ICICIETF	394.34	235.96	-40.16%	0.45%	0.24%	-47.78%
INVESTOETF	395.54	237.15	-40.04%	0.45%	0.24%	-47.22%
KOTAKETF	444.30	285.91	-35.65%	0.51%	0.29%	-44.12%
MIRAEETF	393.05	234.66	-40.30%	0.46%	0.23%	-49.18%
BEESETF	456.08	297.69	-34.73%	0.53%	0.30%	-43.87%
TATAETF	416.84	258.45	-38.00%	0.48%	0.26%	-46.09%
UTIETF	208.61	50.22	-75.93%	0.24%	0.05%	-78.65%
Overall	364.14	205.76	-47.07%	0.42%	0.21%	-54.17%

The Choice of ETFs has been found to impact the return of portfolio. The average weekly return being positive for all the ETFs, the returns of portfolio were lower for all ETFs, however, portfolio with NIFTY BEES has provided lowest excess return with decline of 75.93% in Rupee terms while portfolio with LIC ETF has suffereddecline of 34.73%, when measured in rupee terms. The fund wise performance was same when compared on basis of percentage of investment terms, the returns are negative for all funds.

Table 2 Table Comparing Return of ETFs and Portfolio based on Level ofCalls.

	Weekly Return in Rupee Terms			Weekly Return in % of Investment		
Level of Call Options	**Average return of ETF in Rs.**	**Average return of Portfolio in Rs.**	**% Excess Return in Rupees term**	**Absolute Return on ETF**	**Absolute Return on Portfolio**	**Excess Absolute Return in %**
ATM	385.35	-252.21	-179.27%	0.44%	-0.25%	-168.09%
OTM1	385.35	85.00	-84.45%	0.44%	0.08%	-86.56%
OTM2	385.35	-16.06	-112.87%	0.44%	-0.02%	-111.30%
OTM3	385.35	336.44	-13.75%	0.44%	0.34%	-24.84%
OTM4	385.35	235.57	-42.11%	0.44%	0.24%	-49.78%
OTM5	385.35	552.93	47.12%	0.44%	0.55%	27.28%
OTM6	385.35	412.96	7.76%	0.44%	0.41%	-6.84%
OTM7	385.35	461.08	21.29%	0.44%	0.46%	4.96%
Overall	385.35	226.97	-44.53%	0.44%	0.23%	-51.90%

The excess return generated by portfolio appears to be varying, with lowest being negative 179.27% with ATM Calls and highest gain being 47.12% with OTM 5 calls when measured in Rupee terms. The effectiveness of the covered call measured on the basis of average weekly return as percent of investment shows that excess returns are negative on overall basis except for OTM 5 and OTM 7.

The significancechange in returns of covered call portfolio is measured using paired T-test. The test was applied on 88 pairs of ETFs and Callswith different combinations, to test the null hypothesis that there is no significant difference in ETF returns and return of covered call portfolio. The result shows the t-statistic of 5.184 with DF of 87. The statistic was found to be significant as 95% confidence interval rejecting the null hypothesis. The results were also significant when the returns were compared on percentage terms at weekly level.

The effectiveness of covered call was also measured by calculating percent value of excess returns. The values of excess returns is used to measure the significance of Levels of Calls and choice of ETFs on return generated by covered call portfolios. The ANOVA test was applied on sample of 88 excess returns compared in 8 different levels of calls. The ANOVA on excess average weekly return in Rupee terms found to significantly different $F_{(7,80)}=74.406, p=0.00$ for various call levels. The difference was also significant in case of excess returns of weekly average return as percentage of investment $F_{(7,80)}=74.749, p=0.00$ It was however observed that difference in excess return based on choice of ETFs was found to be not significant.

Analysis of Risk

The impact of adding call shorts to ETFs on risk is also analyzed by using Standard deviation of average weekly returns in Rupee terms and percentage terms. The average standard deviation of weekly ETF returns in Rupee terms was Rs.3761.14 whereas the average Standard deviation of weekly portfolio returns in Rupee terms was Rs. 6356.74

Table 3Table Comparing SD of Return of ETFs and Portfolio, based on Choice of ETFs.

	SD of Weekly Return in Rupee Terms			SD of Weekly Return in % of Investment		
ETF	SD of Portfolio in Rs.	SD of ETF in Rs.	% Excess SD in Rupee terms	SD of Portfolio in %	SD of ETF in %	% Excess SD in Percent terms
SBIETF	2682.59	5730.65	113.62%	3.07%	5.73%	113.62%
AXISETF	3761.14	6356.74	69.01%	3.81%	6.36%	69.01%
BANDHANETF	2646.12	5722.18	116.25%	3.03%	5.72%	116.25%
ICICIETF	2555.36	5763.95	125.00%	2.94%	5.76%	125.00%
INVESTOETF	2529.28	5766.10	127.97%	2.91%	5.77%	127.97%
KOTAKETF	2590.09	5782.22	123.24%	3.06%	5.78%	123.24%
LICETF	2497.18	5782.00	131.54%	2.88%	5.78%	131.54%
MIRAEETF	3113.03	6910.52	124.33%	3.57%	6.91%	124.33%
BEESETF	2961.08	5756.03	94.39%	3.41%	5.76%	94.39%
TATAETF	2815.10	5952.26	113.93%	3.19%	5.95%	113.93%
UTIETF	2682.59	5730.65	113.62%	3.07%	5.73%	113.62%
Overall	3761.14	6356.74	69.01%	3.81%	6.36%	69.01%

The table shows the impact of choice of ETF on the standard deviation. The portfolio consisting of LIC ETF has shown an increase of 131% in standard deviation, whereas portfolio consisting of AXIS ETF has shown an increase of 69% in standard deviation. The average standard deviation of weekly ETF return in percentage terms was 3.81% whereas the average standard deviation of weekly portfolio return was 6.36%

Table 4Table Comparing SD of Returns of ETFs and Portfolio, based on Level of Calls.

	SD of Weekly Return in Rupee Terms			SD of Weekly Return in % of Investment		
Level of Call Options	SD of Portfolio in Rs.	SD of ETF in Rs.	% Excess SD in Rupee terms	SD of Portfolio in %	SD of ETF in %	% Excess SD in Percent terms
ATM	2796.36	7784.69	181.9%	2.85%	7.78%	181.9%
OTM1	2841.38	7760.76	176.5%	3.27%	7.76%	176.5%
OTM2	2841.38	6562.37	133.6%	3.27%	6.56%	133.6%
OTM3	2841.38	6524.29	132.1%	3.27%	6.52%	132.1%

OTM4	2841.38	5405.80	92.0%	3.27%	5.41%	92.0%
OTM5	2841.38	5619.70	99.6%	3.27%	5.62%	99.6%
OTM6	2841.38	4500.48	59.4%	3.27%	4.50%	59.4%
OTM7	2841.38	4107.64	45.3%	3.27%	4.11%	45.3%
Total	2835.75	6033.22	115.0%	3.22%	6.03%	115.0%

The levels of standard deviation changes based in the level of Call option applied in the portfolio. The standard deviation has been increased by181% in case where ATM call has been applied, whereas in case of OTM 5 call the standard deviation has been increased by 5%. The impact of choice of Call levels and ETF is same as appeared standard deviation in Rupee terms.

The significance of change in Standard deviation of the ETF and portfolio has been tested by applying paired t-test. The difference in value of standard deviation was found to be significant in Rupee terms $T(87)= -22.274$, $p=0.00$. The difference was also significant in case of returns measured in percentage terms $T(87)=-18.198, p=0.052$.

The impact of choice of level of calls and ETFs is measured by applying ANOVA test on the values of difference in standard deviation. The impact of choice of ETF was found to be not significant in case of standard deviation measured in Rupee terms as well as in percentage terms $F(8,63)=1.230, p=0.297$. However the impact of choice of calls was found to be significant for change in standard deviation measured in Rupee terms as well as in percentage terms $F(7,80)=59.269, p=0.00$.

Analysis of Rate of Success

The rate of success was calculated to understand the long-term implication of covered call strategy. The data shows that an average of 61.00% of weekly trades consisting of only ETFs were having positive returns, however in case of portfolio of covered call with ETFs, the average rate of positive trades is 65.88% an approximate 8% increase in success rate. The choice of Call level and ETF appears to have impact on rate of success.

Table 5Table Comparing Rate of Success of ETFs and Portfolio, based on Choice of ETFs.

ETF	Rate of Success in Portfolio	Rate of Success in ETF	% Change inRate of Success
SBIETF	63.00%	67.00%	6.35%
AXISETF	61.00%	65.88%	7.99%
BANDHANETF	63.00%	67.63%	7.34%
ICICIETF	58.00%	65.13%	12.28%
INVESTOETF	63.00%	68.13%	8.13%
KOTAKETF	63.00%	67.13%	6.55%
LICETF	65.00%	68.25%	5.00%
MIRAEETF	62.38%	66.25%	6.27%
BEESETF	60.00%	62.88%	4.79%
TATAETF	62.04%	66.47%	7.19%
UTIETF	63.00%	67.00%	6.35%
Total	61.00%	65.88%	7.99%

The success rate was varying with ETFs, ICICI ETF has the lowest success rate of 58%, while LIC ETF has success rate of 65%. The portfolio of Covered call has varied impact on the success rate based on choice of ETFs. Portfolio consisting of BEES ETF has lowest impact of 4.79% in success rate, whereas portfolio consisting of ICICI ETF has impact of 12.28% in rate of success.

Table 6Table Comparing Rate of Success of ETFs and Portfolio, based on Level of Calls.

Level of Call Options	Rate of Success in Portfolio	Rate of Success in ETF	% Change inRate of Success

ATM	61.82%	62.82%	1.84%
OTM1	61.55%	65.18%	6.02%
OTM2	61.55%	66.45%	8.08%
OTM3	61.55%	67.64%	10.01%
OTM4	61.55%	68.45%	11.32%
OTM5	61.55%	68.73%	11.77%
OTM6	61.55%	66.00%	7.35%
OTM7	61.55%	65.00%	5.72%
Total	61.58%	66.28%	7.76%

The success rate was lowest at ATM at 62.82% an increase of 1.84%, whereas the success rate was highest at OTM 5 at 68.73% an increase of 11.77%.

The significance of impact on success rate is measured by applying paired T-test. The difference in rate of success was found to be significant $T(87)=-14.736$, $p=0.00$. The impact of level of calls and ETFs on rate of success is measured by applying ANOVA test, The test was applied on the change in rate of success basedon levels of call and choice of portfolio in ETFs. The result shows that the impact of ETF was significant $F(8,63)=2.35$, $p=0.028$. The result on impact of Level of calls also found to be significant $F(7,80)= 6.592$, $p=0.00$.It appears success rate portfolio is dependent on combination of ETF and Level of call.

Conclusion

The paper has evaluated the impact of call writing on the returns and risk of the ETFs. It is observed that the portfolio returns consisting of ETFs and Call writing has significant impact on returns and risk on the negative side. The returns were significantly lower and risk were significantly higher irrespective of which ETF is chosen in the portfolio. The only exceptions were portfolio consisting of OTM5 and OTM7. The portfolio consisting of OTM5 call options has increase of approximately 47% in Rupee terms and 27% in terms of percentage of investment, however the risk of the portfolio has almost doubled. The outcome shows the high volatility of option instrument, where it is common to lose a year's gain in one week of negative return. Further ETFs though based on Index, do not reflect the Index's movement perfectly and hence causing deviation in returns. The reason for higher return in case of OTM5 portfolios was the higher success rate of 68%. The higher success rate provides more positive outcome hence a better return if the strategy is applied for long term. The study shows that ETF portfolio with call writing can be an option if deep OTM is used for writing and the strategy is applied for long term.

The research however leaves the scope of further research in the area. The research has used only the difference in strike prices to compare and choose the level of options in portfolio, however other methods such choice of options based on volatility and open interest can also be applied for call writing. Similarly, the research has only used ETFs which a reflecting Nifty Index only, which were not having direct correlation with the Index return. The research can be conducted to explore other options like BankNifty or smart beta ETFs or portfolio of ETFs as component against call writing. It can however be concluded that call writing has potential of providing better returns in long run for the investors.

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