A REPORT ON

UNDERLYING ASSET AND DELIVERABLE EQUITY FUTURES AND OPTIONS OF

**ICICI BANK**

Under the supervision of

**DR. THOTA NAGARAJU and DR. SREYA BISWAS**

****

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI

HYDERABAD CAMPUS

**COURSE- DERIVATIVES AND RISK MANAGEMENT: ECON F354**

**Serial Number:** 144

**Name:** P. Prakash Reddy

**ID.NO:** 2017B3AA0663H

**Instrument Name:** ICICI BANK

**Abstract**

The aim of the report is to analyze various financial instruments available for purposes of speculation and hedging for ICICI bank. It is accomplished by analyzing equity, futures and option prices from 1-April-2019 to 31-march-2020. Equity prices and future prices are obtained by calculating risk adjusted and risk-unadjusted return for the considered time period for daily, weekly and monthly frequencies. Equity returns are negative in all frequencies. It is observed that futures are more profitable if traded in monthly frequency. Whereas highest return can be attained by daily trading of far month futures which has given a return of 5.02% per annum. Call option performed poorly in the last financial year. Analysis of the results is done with the help of Sharpe ratio for Equity and Futures. Binomial model is used for analysis of options. Calculations are worked out using both Excel. Vigorous comparative study is done to choose between various financial instruments. Comparison between frequencies & various time to maturity periods are also done to get a thorough understanding of these instruments. Behavior of these instruments, correlation with all listed factors & comparison with actual market data to the one predicted by theoretical models is also done. A final recommendation is made specifying which instruments serve what purpose best.

**Acknowledgments**

I would like to express my sincere gratitude to Dr. Thota Nagaraju AND Dr. Sreya Biswas, for giving me this golden opportunity. This project helped me to get rough understanding of what an investment banker should do, working with real life data and correlating with concepts learned in class gave me enough boost to choose investing profession. We are highly indebted for their support for taking online classes for explaining the expected approach towards the assignment and doubt clarification video came handy without which completion this project would have been a herculean task for me.



Figure 1: ICICI Bank logo

**ICICI Bank**

**TABLE OF CONTENTS**

**1. SECTION 1: Underlying Assets-Equity**

1. Introduction to underlying assets..................................................................6

2. Risk unadjusted equity Returns ..................................................................8

3. Risk adjusted equity Returns......................................................................10

4. The Economic Interpretation......................................................................12

**2.** **SECTION 2: Equity Futures Instrument**

**5**. Equity Futures Instrument introduction.....................................................13

**6.** Near month risk unadjusted Returns..........................................................14

7. Near month risk adjusted Returns…………………………………………14

**8.** Economic Interpretation of near month futures .........................................15

**9.** Next and far month futures calculation and comparisons…………………18

With near month.

**3.** **SECTION 3: Comparisons**

**10.** Comparison between futures and equity and liquidity ..............................23

**4.** **SECTION 4: Contango Trends**

**11.** Backwardation/ Contango Trends.............................................................25

**12.** significance of Frequency .......................................................................26

**5.** **SECTION 5: Options**

**5.1.** Option Price calculations ..........................................................................26

**5.2.** Observations and discussion .....................................................................26

**6.** **SECTION 6: Conclusion.**....................................................................................27

**7**. **SECTION 7: References**………….…………….…………………………….28

**8**. Appendix…………………………………………………………………………28

**Section 1**

**1.** **Introduction to underlying assets**

**1.1.** **Nature of the business**

“**ICICI Bank Limited** is an Indian origin international banking and financial services company its registered office in Vadodara, Gujarat. Its headquarters is in Mumbai, Maharashtra. In terms of market capitalization ICICI Bank is the second-largest bank in India. It offers a wide varieties of banking products and financial services for retail and corporate customers through a variety of subsidiaries and delivery channels in the areas of life, non-life insurance, investment banking, asset management and venture capital. The bank has 15,589 ATMs and a network of 5275 branches across India and attending its clients in 16 other countries.” (wikipedia, n.d.)

**1.2.** **Ownership**

ICICI is a publicly owned private sector company. (icici.bank, n.d.)

|  |  |
| --- | --- |
| **Shareholder** | **Shareholding** |
| Foreign Institutions | 36.15% |
| Global depository receipt | 21.04% |
| Banks Mutual Funds | 20.51% |
| Financial Institutions | 13.57% |
| General Public | 5.72% |
| Central Government | 0.31% |
| Others | 2.69% |

**1.3.** **Origin of the company**

“ICICI Bank was established by the **Industrial Credit and Investment Corporation of India (ICICI)**, an Indian financial institution, as a wholly owned subsidiary in 1994. Its parent company was formed in 1955 as a part of joint venture of the World Bank, India's public-sector banks and public-sector insurance companies to provide project financing to the Indian industry.” (wikipedia, n.d.) (icici bank, n.d.)

**1.4.** **Importance of the industry**

“ICICI bank belongs to the banking sector. Its largest private sector bank in India in terms of assets and the second largest private sector bank in terms of assets and market capitalization just behind HDFC. It is also listed as one of the big four banks, and thus commands respect in the industry. It is so far successful in its aim to aid in development, formation and modernization in private sector.” (icici bank, n.d.)

**1.5.** **Greatness of the company**

“ICICI is one of the very first private sector banks in India. It is one of the big four banks of India. It has been giving its for their customers across the globe. ICICI is known for its role in Indian financial infrastructure, CSR activities and bringing technological advances into banking sector like mobile banking, ATM cards etc. Being one of the oldest private sector banks in the country, it is striving to provide best experience to its customers. It also has many awards and achievements on its name for excellence in banking sector.” (icici bank, n.d.)

**2. Risk un-adjusted equity analysis**

From the Table 1, risk un-adjusted returns are negative for daily, weekly and monthly trading. None of the trading frequencies are giving positive reward/risk ratio.

Monthly frequency has highest standard deviation.



Table 1: Comparison of the Daily, Weekly and Monthly risk-unadjusted returns.

Figure 2: Daily returns of un-adjusted underlying stock.

Figure 3: weekly returns of un-adjusted underlying stock.

Figure 4: Daily returns of un-adjusted underlying stock.

**3. Risk adjusted equity analysis**

From the Table 2, we can see that risk adjusted return are negative for daily, weekly and monthly trading. None of the trading frequencies are giving positive reward/risk ratio.

Monthly trading has highest standard deviation.



Table 2: Comparison of the Daily, Weekly and Monthly risk-adjusted returns of underlying stock.

Figure 5: Daily returns of un-adjusted underlying stock.

Figure 6: Weekly returns of un-adjusted underlying stock.

Figure 7: Daily returns of un-adjusted underlying stock.

**4. Economic Interpretation**

Risk un-adjusted return doesn’t consider the risk involved in achieving the return whereas Risk-adjusted return further refines return by considering the amount of risk involved in gaining the return. Therefore, risk adjusted returns are always lesser than risk unadjusted returns. Hence, it is mandatory for an investor to take Risk adjusted return into consideration before investing with which investor can balance between risk and reward. Here, we can use Sharpe ratio to indicate risk adjusted returns.

**Observations:**

* The volatility (i.e.) standard deviation of risk adjusted and risk un-adjusted are almost the same
* The volatility is higher in case of monthly contracts followed on by monthly and daily returns for both risk adjusted and risk-unadjusted returns.
* From the Table 3 we can see that all Sharpe ratio values are negative which implies lower risk adjusted returns from all the frequencies.
* Part of decline in stock prices can be attributed to Chanda Kochhar stepping down from her post due to immediate effect.

**Plan of action:**

* Based on Sharpe ration values, it is advisable not to invest in underlying stock.
* It would be better to buy treasury bills when compared to ICICI stocks.



Table 3: comparison of Sharpe ratio of the underlying asset at various frequencies.

Figure 8: comparison of Sharpe ration at various frequencies for underlying stock

**SECTION 2**

**EQUITY FUTURES INSTRUMENT**

**5.1 Commencement of Equity Futures**

The ICICI BANK equity futures started on 17th of september,1997 on the National Stock Exchange.

**5.2 Contract Specification and Lot size**

“ICICI is trading with a lot size of 1375 in the Futures and Options market of the NSE

with 66,538 near, next and far month future contracts and 91,185,875 open interest.”

(money control, n.d.)

|  |  |
| --- | --- |
| Symbol | ICICIBANK |
| Instrument | Futures stock |
| Trading Cycle | 3 months (Near, Next, Far) |
| Expiry date | Generally, on Last Thursday of the expiry month |

**5.3 Overall greatness**

“Being the one of the Big four banks of India, market capitalization average is increasing, depicting the increase in confidence of the investors investing in these futures. These futures also seen close movement with ICICIBANK stock prices. They provided a facility for an investor to lock the future price of the asset which is helpful in managing risk.” (icici bank, n.d.)

**6. Near month risk un-adjusted Returns**

Firstly, near month is the present month of trading and the contracts. In case of near month contract generally expires on the last Thursday of the month if it’s not a working day or else preceding working day. From the table 4 we see that daily returns and weekly returns of far month are negative while monthly returns are positive and accountable for 3.2% return per annum. Therefore, we can conclude from the risk un-adjusted returns that monthly frequency is best for trading on near month futures.



Table 4: Comparison of the Daily, Weekly and Monthly risk un-adjusted Near Month returns (Returns in %)

**7. Near month Risk adjusted Returns**

Returns have very less significance if we are not talking about risk complementing those returns. Risk adjusted returns allows us to mitigate risks which are accompanying those return. From the table 4 it is evident that daily and weekly returns are negative and monthly return are positive which can be accountable to 3.17% returns per annum. Therefore, we can conclude that near month trading profitable only in case of monthly trading in futures.



Table 5: Comparison of the Daily, Weekly and Monthly risk-adjusted Near Month returns (Returns in %)

**8. Futures Economic Interpretation**

Risk adjusted returns take risks and return both into consideration unlike risk-adjusted returns where only returns are taken into consideration, which helps us to mitigate risk. From the table 3 and 4, we can see that we have positive returns only in case of monthly trading, further monthly returns are less in case of risk adjusted return when compared to risk un-adjusted return because risk is taken into consideration in the risk adjusted case.

**Observation:**

* The risk (standard deviation) is increasing from daily, weekly to monthly for risk adjusted scenario. (i.e.) Risk: Monthly > Weekly > Daily
* From the Table 6 Sharpe ratio of monthly is better than daily and daily is better than weekly
* The mean risk adjusted returns are in order of: - Weekly < daily < Monthly

**Action to be taken:**

* For an investor it would be better to do monthly trading.

Figure 9: Near Month Risk adjusted Returns in Daily Frequency

Figure 10: Near Month Risk adjusted Returns in Weekly Frequency

Figure 11: Near Month Risk adjusted Returns in Monthly Frequency.



Table 6: Sharpe ratios of current month futures at all the frequencies.

Figure 12: Plot between Sharpe ratio and all the frequencies for current month.

**9. COMPARISON**

9.1Comparison of Near, Next and Far month Risk non-adjusted and Risk adjusted Returns

From the risk adjusted tables of Near month (Table4), Next month (Table 6) and far month

(Table 8) and Sharpe ratio of near (Table 6), next (Table 9) and far month (Table 12). We can see that the futures contract of the far month has better returns than the near or next month. More specifically in far month contract it is preferable to choose daily trading as it is having return of 0.11425 % which can make up to 5.02 % return per annum. In case of weekly trading only far month have positive return with return being 0.6237 % which can make up to 4.1% per annum. In case of monthly trading all near, next and far month have positive return with far month serving with the best return of 2.548% which can make up to 3.525% per annum. One more reason to choose far month daily contract is for its lowest standard deviation when compared to all frequencies of near and next month contracts

* **NEXT MONTH**



Table 7: Comparison of the Daily, Weekly and Monthly risk **un-adjusted Next Month** returns (Returns in %)



Table 8: Comparison of the Daily, Weekly and Monthly risk **adjusted Next Month** returns (Returns in %)



Table 9: Sharpe ratio of next month futures at all the frequencies.

Figure 13: Plot between Sharpe ratio and all the frequencies for next month futures.

Figure 14: Risk adjusted next month in returns daily frequency.

Figure 15: Risk adjusted next month in returns weekly frequency.

Figure 16: Risk adjusted next month returns in monthly frequency.

* **FAR MONTH**



Table 10: Comparison of the Daily, Weekly and Monthly risk **un-adjusted Far Month** returns (Returns in %)



Table 11: Comparison of the Daily, Weekly and Monthly risk **adjusted Far Month** returns (Returns in %).



Table 12: Comparison of Sharpe ratio values of far month at all the frequencies.

Figure 17: Comparison of Sharpe ratio values of far month at all the frequencies.

Figure 18: Risk adjusted Far month returns in daily frequency.

Figure 19: Risk adjusted Far month returns in weekly frequency.

Figure 20: Risk adjusted Far month returns in monthly frequency.

9.2Comparison of Near month Returns with the underlying asset return.

From the table 14 we can see that risk adjusted returns for the underlying stock is negative for daily, weekly and monthly trading. From the same table, near month monthly trading gives positive return at 2.341% which can make up to 3.2%per annum. Therefore, it is better to choose futures over buying the underlying asset.

**SECTION 3**

**10. Comparisons**

From the table 14 (i.e.) risk adjusted returns comparison between futures and underlying stock shows that returns of the underlying asset is negative in daily, weekly and month trading cases. Whereas, futures shown positive returns.

* Daily trading is only profitable in case of far month.
* Weekly trading is profitable only in case of far month.
* Monthly trading is profitable in near, next and far month trading scenarios, out of these three, far month has given highest return.
* Only far month futures gave all positive returns in daily, weekly and monthly trading.
* Out of all these, daily trading in far month futures gave maximum return of 5.02% per annum followed by far month weekly trading in futures.
* The highest return in far month futures can be attributed to high liquidity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **un-adjusted** | **Underlying asset** | **Futures** | | |
|  |  | **Near** | **Next** | **Far** |
| **Daily** | -0.05 | -0.047 | -0.0534 | 0.129 |
| **Weekly** | -0.14 | -0.129 | -0.239 | 0.639 |
| **Monthly** | -1.23 | 2.341 | 2.31 | 2.564 |

Table 13: comparison of the returns of risk un-adjusted underlying assets returns with risk

un-adjusted future returns for near, next, far months and its daily, weekly and monthly returns respectively. (returns in %)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **adjusted** | **Underlying asset** | **Futures** |  |  |
|  |  | **Near** | **Next** | **Far** |
| **Daily** | -0.07 | -0.062 | -0.0683 | 0.114 |
| **Weekly** | -0.16 | -0.144 | -0.254 | 0.6237 |
| **Monthly** | -1.24 | 2.326 | 2.295 | 2.548 |

Table 14: comparison of the returns of risk adjusted underlying assets returns with risk adjusted future returns for near, next, far months and its daily, weekly and monthly returns respectively. (returns in %)

**Liquidity Position:**

Open interest is a measure helpful for knowing the liquidity position of futures. Higher the open Interest value implies higher liquidity. If we consider average Daily values of open interest.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Near month** | **Next month** | **Far month** |
| **average open interest** | 172033.6 | 15125805.8 | 105380.0 |

Table 15: Average Open interest values of daily values of near, next and far month.

From the Table 11 we can see that observations it can be inferred that liquidity position of Next month is far greater than near and far months.

**SECTION 4**

**11.Contango/ Backwardation graph:**

* The futures prices are higher than that of the underlying stock from June to august,2019 and February to march, 2020. It follows the contango phenomenon in this time period.
* The futures prices are lower than that of underlying stock from august to December in 2019. It exhibits backwardation in this time period.
* For the rest of the time futures and underlying stock prices are almost same

**12.Frequency significance**

**Observation**

* Daily and weekly trading is profitable only in case of far month futures only.
* All the monthly frequency returns of the futures are positive.
* Average monthly trading returns are the highest followed by weekly and daily frequency.

**Action to be taken**

* Therefore, monthly trading is profitable when compared to daily and weekly.
* Hence, we can conclude that frequency matters and monthly frequency is best for trading in futures.



Table 16: Risk adjusted returns of underlying stock and futures of near, next and far month at daily, weekly and monthly frequencies. (returns are in %).

**SECTION 5**

**OPTIONS**

We have employed the Binomial model to calculate the option prices and compared them to the market prices with the help of European call option.

**European Call options: -**

**Observations**

* We observe that from actual prices and calculated prices are almost the same from April to the last week of May. Later, both got diverged with calculated prices being much more than actual price.
* For most part of the financial year the theoretically calculated option prices is lower than that of the actual price. This is because the theoretical model does not account for all types of risks and the difference in these prices is the risk premium for those risks.
* Even though the calculated values and actual prices didn’t converge but it rightfully captured the trend of option prices except at the end of the financial year.
* Implied volatility decreased down the last financial year.

**SECTION 6**

**Overall conclusion**

ICICI bank being the one of the Big four banks of India is a systematically key financial institution of India. Since its inception, it has progressed into becoming India's second largest biggest private bank in terms of assets and market capitalization. It has been successful managing its equity shares. These company’s financial instruments are also easily liquefiable. Although, the average equity returns are negative for the last financial year, these stock prices gradually improved in the last quarter of the financial year. If an investor is ready to take risk and make your bet based on last quarter, buying equity would be a great chance to make profits. In case of futures it is evident that monthly trading is giving better results than daily or weekly. If an investor is interested in daily or weekly trading far month trading is highly suggestable. The high lot size of the Futures allows to regulate price quotes. The call option prices perform poorly in the last quarter. This might be due economic slowdown in India.

Overall, ICICI bank is a good company for all kinds of investors and especially for those investors who want to reduce risk in their portfolio.

**SECTION 7**

# Bibliography

*icici bank*. (n.d.). From history page: https://www.icicibank.com/aboutus/history.page

*icici.bank*. (n.d.). From icici share price page: https://www.icicibank.com/aboutus/shareprice.page

*Investopedia*. (2020, april 17). From Investopedia terms: https://www.investopedia.com/terms/s/sharperatio.asp

*money control*. (n.d.). From stock icici: https://m.moneycontrol.com/stock/icicibank/ICI02/india/fnoquote

*wikipedia*. (n.d.). From wikipedia: https://en.wikipedia.org/wiki/ICICI\_Bank

# **APPENDI****X**

# **Sharpe Ratio**

“Sharpe ratio and is used to help investors to understand about the risk accompanying return. The ratio is the average return per unit of uncertainty or total risk received above the risk-free price. In general, the higher the Sharpe ratio value, higher the risk-adjusted return is.” (Investopedia, 2020)

Sharpe Ratio = (Rp-Rf)/stdev(p).

Rx=return of portfolio(risk-adjusted).

Rf=Risk free interest rate.

stdev(p)= standard deviation of portfolio.