Applying Lucas Sequence For Optimal Stock Market Entry And Exit Points

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ABSTRACT
The Fibonacci sequence and Golden Ratio have been observed in various aspects of nature and daily life, from the number of petals on flowers to the proportions of the human body. This study explores the application of the Lucas sequence, a series of integers closely related to the Fibonacci sequence, to maximize stock market profits. The Lucas sequence exhibits a consistent pattern, with the ratio between consecutive terms converging to the Golden Ratio of 1.618. In stock market analysis, Lucas Ratios, derived from the Lucas sequence, play a crucial role in identifying support and resistance levels and predicting asset value retracement. By utilizing these ratios, traders can strategically position buy and sell orders and identify the optimal entry and exit points, thereby maximizing profits and minimizing losses. This study presents two distinct trading methodologies based on the Lucas Ratios: the Trend Reversal Lucas Strategy and the Trend Continuous Lucas Strategy. These strategies provide guidelines for buying and selling decisions based on market trends and Lucas Ratio levels. The study concludes that the Lucas sequence can be a valuable tool for stock market analysis, particularly when used in conjunction with other fundamental and technical methods to enhance the accuracy of entry and exit points.

Key words: Stock market, Lucas Sequence, Profit and loss Strategies, Fibonacci Sequence.

I. INTRODUCTION

Leonardo Fibonacci devised the Fibonacci sequence, which is a mystical integers series. The Fibonacci sequence is a set of integers where the sum of the two numbers before it is the next number. 1,1,2,3,5,8,13,21,34 will be the order. if we start with the number 1 and 1. We can also find this sequence by using the recursive relation. Fibonacci numbers and the Golden Ratio can be found in many places not just in arithmetic, but also in nature and daily life. For example, counting the number of petals on a flower is the Fibonacci number, which is a number from the Fibonacci sequence. Many flowers have three, five, eight, thirteen, twenty-one, or more petals. Fibonacci numbers can also be found in the human body; we have two hands, each with five fingers and each divided into three portions; all of these numbers are Fibonacci numbers. In addition, the lengths of the bones in your hand are all Fibonacci numbers.
The Golden Ratio is another existing offshoot of the Fibonacci sequence. If we have two quantities A and B, where A is greater than B, we can find the golden ratio. Then divide the result by a after adding A and B. We would state that A and B have a Golden Ratio if this ratio turns out to be equal to the ratio of A and B. The Greek letter Phi (ø) is used to signify it and the value is 1.618… Calculate the ratio using the formula after writing down the Fibonacci sequence. You'll see that the Golden Ratio, whose value is close to 1.168033, appears in Fibonacci numbers. Golden spirals are a type of logarithmic spiral that are produced in geometry when the Golden Ratio is used as a growth factor. One of nature's most prevalent instances of the Golden spiral is seen in seashells. Examples of the numerous naturally occurring things include ocean waves, hurricanes, flower buds, snail shells, and spider webs. The Golden Ratio or spiral is a popular artistic motif. In his masterpiece, Salvador Dali, a great painter, expressly exploited the ratio. the final supper's sacrament. When creating skyscrapers and other large structures, architects frequently apply the Golden Ratio. Le Corbusier, a well-known Swiss-French architect who is regarded as one of the forerunners of modern architecture, specifically used the Golden Ratio and his modular system scale of architectural proportion. The Golden Ratio is present in everything, from Snell's shells to flowers, bananas to the interior of the human ear, huge iconic structures to galaxies. It is most likely called the divine proportion for this reason.

II. LITERATURE REVIEW

(Wang & Xie, 2024) conducted a study exploring the utilization of machine learning algorithms for stock price forecasting and profit generation strategies within the Chinese stock market. Their research evaluated the efficacy of diverse machine learning techniques in predicting stock prices and formulating profitable trading approaches. While the study presents a sophisticated approach to stock market valuation, these potential weaknesses suggest areas for further refinement and validation of the model.
(Anari & Kolari, 2009) This research presents a comprehensive analysis focused on a profit-oriented framework for assessing stock market value. The study utilizes the profit system model to compute and forecast company earnings, which are then incorporated into a discounted cash flow (DCF) methodology to determine fundamental stock values. The authors implement this strategy on two stock market indices: the Standard and

Poor's Industrial index (SPXI) and the Center for Research in Security Prices (CRSP) index. A significant outcome emphasized in this study is the model's ability to detect market bubbles and predict their eventual convergence with long-term profit trends.
(Sethi et al., 2020) This paper explores the use of Fibonacci retracement in analyzing stock markets. It starts by providing an overview of the Fibonacci sequence and the golden ratio, detailing their mathematical characteristics and historical importance. The study then examines how these principles are utilized to interpret stock market patterns and price fluctuations. Additionally, the paper addresses the constraints of Fibonacci retracement as an analytical tool for stocks. It points out that while this method can be beneficial, its efficacy remains controversial, and it should not be employed as a standalone technique. The document stresses that successful implementation of Fibonacci retracement demands expertise and should be complemented by other technical and fundamental analysis approaches.

III. LUCAS SEQUENCE

The Lucas sequence, or Lucas number, represents a series of integers introduced by mathematician François Édouard Anatole Lucas (1842–1891), who also delved into the related Fibonacci numbers. These two sequences exhibit many common characteristics, with Lucas numbers often utilized in equations concerning Fibonacci numbers. Additionally, the Fibonacci sequence manifests in multiple formulas linked to Lucas numbers. A key feature is that regardless of the initial pair of positive values chosen, the ratio between consecutive terms will eventually converge to Phi=16180339. This phenomenon is demonstrated by the ratio of Lucas numbers 199/123 = 1.618, which mirrors the ratio of Fibonacci numbers 89/55 = 1.618, a pattern that recurs throughout the sequence [4].
We take two initial values $\beta_0 = 2$, $\beta_1 = 1$

$$\beta_{n+2} = \beta_n + \beta_{n+1} \quad ; n \geq 0$$

2,1,3,4,7,11,18,29,47, 76,123,199… .,
If we interchange the initial values then we get the Fibonacci Sequence. $\beta_0 = 1$, $\beta_1 = 2$
1,2,3,5,8,13,21,34,55,89, 144… .,

Ratio of Fibonacci and Lucas Sequence

N	Fibonacci Sequence	α_n/α_{n-1}	Lucas Sequence	β_n/β_{n-1}
1	1		2	
2	1	1/1=1	1	½=0.5
3	2	2/1=2	3	3/1=3
4	3	3/2=1.5	4	4/3=1.3333
5	5	5/3=1.6666	7	7/4=1.75
6	8	8/5=1.6	11	11/7=1.5714
7	13	13/8=1.625	18	18/11=1.6363
8	21	21/13=1.6153	29	29/18=1.6111
9	34	34/21=1.6190	47	47/29=1.6206
10	55	55/34=1.6176	76	76/47=1.6170
11	89	89/55=1.6181	123	123/76=1.6184
12	144	144/89=1.6179	199	199/123=1.6178
13	233	233/144=1.6180	322	322/199=1.6180
14	377	377/233=1.6180	521	521/322=1.6180
15	610	610/377=1.6180	843	843/521=1.6180
16	987	987/610=1.6180	1364	1364/843=1.6180

Table No.1 The relation of Lucas sequence and golden ratio : if we take integer powers of golden ratio then we get the Fibonacci Sequence. $\emptyset^n = (1.618\ldots)^n$

S.N	N	Lucas Sequence	Golden ratio $\emptyset^n = (1.618\ldots)^n$	By Rounding off
1	-	2	-	
2	-	1	-	
3	2	3	$(1.618\ldots)^2$=2.6180…	3
4	3	4	$(1.618\ldots)^3$=4.2360…	4
5	4	7	$(1.618\ldots)^4$=6.8541…	7
6	5	11	$(1.618\ldots)^5$=11.0901…	11
7	6	18	$(1.618\ldots)^6$=17.9442…	18

8	7	29	$(1.618\ldots)^7$=29.0344…	29
9	8	47	$(1.618\ldots)^8$=46.9787…	47
10	9	76	$(1.618\ldots)^9$=76.0131…	76
11	10	123	$(1.618\ldots)^{10}$=122.9918…	123
12	11	199	$(1.618\ldots)^{11}$=199.0050…	199

Table No.2: Maximizing Stock Market Profits with Lucas Ratios

As illustrated earlier (Table 1), the Lucas series exhibits a consistent pattern: dividing each number by its immediate predecessor yields a Golden Ratio of 1.618. In stock market analysis, the Lucas Ratios play a crucial role in technical trading patterns. These ratios help traders identify support and resistance levels where current trends may either bounce back or reverse, irrespective of their direction. The Lucas sequence of natural numbers (e.g., 2, 1, 3, 4, 7, 11, 18, 29, 47) forms the basis for calculating these levels. The distinctive characteristics of these values are used to compute Lucas ratios (23.6%, 38.2%, 61.8%, etc.), which assist in forecasting asset value retracement. Traders can utilize the Lucas ratio levels to strategically position buy and sell orders and identify the two extreme positions (peak and trough) for asset transactions, thereby maximizing profits and minimizing losses. This pattern is visually represented by horizontal lines indicating support and resistance levels along with potential trading price ranges for specific assets. It serves as an effective tool for recognizing bullish and bearish trends and placing entry orders to capitalize on them. Essentially, retracement refers to the price difference between an asset's high (peak) and low (trough) prices over the anticipated period after applying Lucas percentages.

IV. MAIN RESULT

A significant stock price increase benefits traders, as they can simply await market correction or pullback. By recognizing Lucas levels (23.6%, 38.2%, and 61.8%), market participants can make informed choices regarding stock purchases or sales. In cases where a downward trend begins to reverse, these retracement levels serve as tools for predicting future market directions and identifying the most advantageous moments for selling assets. Calculating Lucas ratios, The Lucas percentage was derived from a further analysis of the patterns in these numbers. Each number is divided by the number that follows in the first, second, and third positions. In the stock market analysis, Lucas trading percentages are utilized to identify support and resistance levels within the prevailing trend. 2,1,3,4,7,11,18,29,47,76,123,199... As an illustration, if we select 144 (any number) as the Lucas number from this sequence
199/199=1, 123/199=0.6180,76/199=0.3819,47/199=0.2361,29/199=0.1457, 18/199=0.090…

All are Lucas ratios

Lucas Ratios	0.09	0.23	0.38	0.61	1	1.23	1.38	1.61	2
Lucas%	0%	23%	38%	61%	1%	123%	138%	161%	2%

The golden ratio of Lucas is the point at which the price will retrace. Lucas golden ratio are 23%, 38%, 61%.....123%, 138%, 161%...
How to Use this tool?

This mechanism can be applied under two distinct circumstances.

a. During periods of market turbulence, this approach is advantageous for investors aiming to secure stocks at optimal prices and curtail potential losses. In an upward-trending market, Lucas golden ratios can be utilized to anticipate possible future market shifts. The technique involves pinpointing the zenith and nadir of the graph. If the graph ascends from its lowest point and attains the 38.2 percent mark, then the nadir is substantiated. Conversely, if the graph declines before reaching the 38.2 percent level and establishes a new low, one must await verification and reassess the graph's highest and lowest points. b. In a rebounding market, this strategy benefits those intending to divest shares at premium rates to optimize returns. Amid market downturns, the Lucas ratio can inform decisions regarding the exit timing. The process entails identifying the nadir and zenith of the graph. If the graph descends from its peak and touches the 38.2 percent mark, the zenith is corroborated. However, if the graph rises before hitting the 38.2 percent threshold and forms a new peak, one must wait for confirmation and reevaluate the graph's lowest and highest points.

What is the function of the measurement tool?

Potential areas of support or resistance were determined using 23.6%, 38.2%, 50%, 61.8%, and 100%, respectively. When these percentages are applied to the range between the highest and lowest prices during a chosen timeframe, a series of price targets are generated. In both upward and downward market movements, prices often backtrack to a significant portion of the previous trend before resuming their original course. These reverse movements frequently exhibit specific patterns, such as Lucas retraction levels.

Figure 1.

Trade Methodology:

We can use two distinct ways to apply the Lucas Ratios.

Purchasing and selling strategies

S. No.	Buying Strategy	Selling Strategy
Trend Reversal Lucas Strategy	Step-I Construct Lucas Ratios from the highest to the lowest point. When the market is ascending from its lowest point and reaches the 38.2 percent Lucas Level, consider making a purchase and placing a stop loss at 23.6 percent. Subsequently, verify that the gap between the purchase price and stop loss price is 2%. (This 2% difference is mandated by the Risk Revert Relation rule). If the difference adheres to the RRR rule, proceed with the trade; otherwise, abandon it.	Plot Lucas Ratios in ascending order Arrange Lucas Ratios from the lowest to the highest point. When the market declines from its peak and reaches the Lucas Level of 38.2 percent, it's advisable to consider placing a stop loss at 23.6 percent. Subsequently, verify that the gap between the purchase price and stop loss price is 2%. (This aligns with the Risk Revert Relation rule, which stipulates a 2% difference). If the difference complies with the RRR rule, proceed with the trade; otherwise, it's best to abstain from that particular transaction.
	Step -II When the market surpasses the 50% ratio threshold, it becomes necessary to elevate the stop-loss level to 38.2%.	Step -II If the market crosses the ratio level of 50%, the stoploss level must be increased to 38.2%.
	If the market crosses the ratio level of 61.8%, the stoploss level must be increased to 50%.	If the market crossing the ratio level of 61.8% then we have to increase the stoploss level at 50%.
	When the market surpasses the 100% ratio threshold, it becomes necessary to increase the stop-loss level to 78.6%.	When the market surpasses the 100% ratio threshold, it becomes necessary to increase the stoploss level to 78.6%.
	The initial secure profit-taking level is at the 61.8% Lucas Ratio, followed by a second level at the 100% Lucas Ratio. If the market price reaches the 100% Lucas Ratio, the subsequent profit-taking target becomes the 161.8% Lucas Ratio. It is important to note that the third level carries significantly higher risk.	The initial secure profit-taking level corresponds to the 61.8% Lucas Ratio, followed by a second level at the 100% Lucas Ratio. If the market price ascends to the 100% Lucas Ratio, the subsequent profit-taking target will be set at the 161.8% Lucas Ratio. It's important to note that the third level carries a significantly higher risk.
	These are the three levels where profit can be booked.	These are the three levels where profit can be booked.

Trend Continuous Lucas Strategy	Lucas plot ratios from lowest to highest. When the market declines from its peak and reaches the Lucas Level of 78.6% or 61.8%, with a closing at 50%, it is advisable to consider setting a stop loss of 61.8%. Subsequently, we verify that the gap between the selling price and the stop-loss price is 2%. This aligns with the Risk Revert Relation (RRR) rule, which stipulates a difference of 2 %. If the price difference adheres to the RRR rule, proceeding with the trade is acceptable. Otherwise, it would be prudent to abstain from trade.	Plot Lucas Ratios from the lowest to the highest point. When the market declines from its peak and reaches the Lucas Level of 78.6% or 61.8%, with a closing at 50%, it's advisable to consider setting a stop loss at 61.8%. Subsequently, verify that the gap between the selling price and stop loss price is 2%. This aligns with the Risk Revert Relation (RRR) rule, which stipulates a 2% difference. If the price difference adheres to the RRR rule, proceeding with the trade is acceptable. Otherwise, it's prudent to abstain from the trade.
	Step -II When the market surpasses the 38.2% ratio threshold, it becomes necessary to increase the stop-loss level to 50%.	Step -II If the market crosses the ratio level of 38.2%, the stoploss level must be increased to 50%.
	If the market surpasses the 23.6% ratio threshold, it becomes necessary to increase the stop-loss level to 38.2%	If the market crossing the ratio level of 23.6.% then we have to increase the stoploss level at 38.2%.
	When the market surpasses the 23.6% ratio level and closes at 0%, it becomes necessary to increase the stop-loss level to 23.6%.	When the market surpasses the 23.6% ratio level and closes at 0%, it becomes necessary to adjust the stop loss level to 23.6%
	The initial secure profit-taking level corresponds to the 61.8% Lucas Ratio, followed by a second level at the 100% Lucas Ratio. Should the market price ascend to the 100% Lucas Ratio, the subsequent profit-taking target will be set at the 161.8% Lucas Ratio. It's important to note that the third level carries a significantly higher risk.	The initial safe profit-taking threshold was set at a 61.8% Lucas Ratio, followed by a second target at a 100% Lucas Ratio. If the market price reaches the 100% Lucas Ratio, the subsequent profit-taking level will be established at the 161.8% Lucas Ratio. It is important to note that this third level carries significantly higher risk.
	These are the three levels at which profits can be booked.	These are the three levels where profit can be booked.

Table No.3

V. CONCLUSION

This study makes valuable contributions to our understanding of how the Lucas sequence can be utilized in financial markets, particularly in the context of stock trading. This study integrates investor sentiment analysis with technical indicators to provide a more comprehensive approach to understanding market behavior. Prior to investing in stocks, investors typically seek to predict the future value of specific stocks or the overall market. Various fundamental and technical methods exist for forecasting the resistance and support levels. Lucas retraction is a technique that can be employed to predict stock prices, sharing some characteristics with the Fibonacci sequence. However, the Lucas sequence progressed more rapidly than its Fibonacci counterpart. Lucas retraction is calculated by applying two data points (high and low) on a graph either manually or through automated methods. To enhance the accuracy of the entry and exit points, Fibonacci retraction is often used in conjunction with other fundamental techniques.

Conflicts of Interest:
"The author declares that there are no conflicts of interest regarding the publication of this paper."

Author Contribution:
"The author is responsible for the conception, design, data collection, analysis, interpretation, and writing of the manuscript."

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"The author declares that no AI tools were used in the creation, writing, or data analysis of this manuscript."

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