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# Long-Term vs. Short-term investment performance: A daily rolling return analysis of the Nifty 50 index from 1992 to 2024

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**Abstract**
Using daily rolling return analysis, this study looks at how long-term and short-term investments in the Nifty 50 index have done from 1992 to 2024. The results show that long-term investments (5 years or more) do much better than short-term ones. They have lower volatility and higher risk-adjusted returns. Short-term trading is more variable and sensitive to market disturbance. The results show that investing in Indian stocks for a long time can be quite profitable, which supports buy-and-hold techniques for building wealth.

**Keyword:** NSE Nifty 50, Indian stock market, daily rolling return

## 1. Introduction
The Indian equity market, one of the fastest-growing financial ecosystems in the world, has undergone a remarkable transformation over the past three decades. As of 2023, it ranks among the top 10 largest equity markets globally by market capitalization, reflecting India's emergence as a key player in the global economy (Shah, 2014) [1]. The market is deep, diverse, and dynamic, serving a broad spectrum of investors ranging from retail participants to institutional behemoths. Equity indices are at the center of this universe, acting as market performance, economic health, and investor sentiment barometers (Bala, 2013) [2].

### 1.1 Objectives
The study aims to comprehensively analyze the performance of the Nifty 50 Total Return (TR) index across varying investment horizons, examining the consistency of positive and negative returns and identifying trends in its performance over time. It seeks to measure the volatility and risk associated with short-term investments compared to long-term investments in the index, providing insights into the trade-offs between risk and return. Additionally, the study aims to determine the optimal investment duration for investors seeking stable and reliable returns, while also evaluating the annualized return and volatility profile of the Nifty 50 TR index across different periods. These objectives collectively aim to offer a detailed understanding of the index's behavior, helping investors make informed decisions based on their financial goals and risk tolerance.

### 1.2 Significance of the study
The analysis of long-term versus short-term investment performance, particularly in the context of the Nifty 50 Index from 1992 to 2024, reveals distinct characteristics and implications for investors. The research highlights the importance of understanding market behavior across different time horizons, which can inform investment strategies. Short-term investments (3 days to 3 months) exhibit random market behavior, indicated by a Hurst exponent (H) of approximately 0.5, suggesting a lack of long-range correlation (Mahata & Bal, 2020) [5]. Short-term performance is often assessed through immediate returns, which can be volatile and influenced by market sentiment and news events (Ringrose, 2015). Long-term investments (5 months and beyond) show a Hurst exponent of 0.75 or higher, indicating a tendency for long-range correlation and more stable returns (Mahata & Bal, 2020) [5].

Long-term investors can benefit from valuation-based market timing, which enhances risk-adjusted returns compared to static strategies (Pfau, 2012) [7]. The relevance of the research is that it can offer meaningful insights to policymakers, investors, and scholars in terms of decisions they can implement. Through analyzing the performance of the Nifty 50 index over various time horizons of investment and judging its risk-adjusted returns, the research makes a point on the significance of long-term investing in attaining financial growth and stability. Its implications are quite significant in relation to the Indian equity market since long-term investing has always ensured positive and constant returns. While long-term investment strategies are often favored for their potential to yield higher returns, some argue that prioritizing long-term shareholders can lead to value destruction, as managers may focus excessively on long-term goals at the expense of immediate performance (Fried, 2015) [8]. This highlights the complexity of investment strategies and the need for a balanced approach.

### 1.3 Hypothesis

- **Null Hypothesis ($H_0$):** The proportion of positive and negative returns is the same across all investment periods.
- **Alternative Hypothesis ($H_a$):** The proportion of positive and negative returns differs across investment periods.

### 1.4 Methodology

The study consists of a detailed examination of the performance of the Nifty 50 Total Return (TR) index over different investment periods from 1 year to 10 years based on daily rolling returns from the start of the index in 1992 to March 28, 2024. The research classifies the returns into CAGR ranges, computes the major statistics like minimum, maximum, median, and mean CAGR, and checks the frequency distribution of positive and negative returns. Moreover, the volatility profile and annualized return are examined to calculate the return-to-risk ratio, giving an indication of the risk-adjusted performance of the index. A Chi-Square test for independence is used to check the hypothesis that the ratio of positive and negative returns varies with investment horizons. The findings are interpreted to detect trends, evaluate volatility, and identify the best investment horizon, providing actionable insights for investors in search of stable and consistent returns. This systematic methodology guarantees a strong assessment of the Nifty 50 index's long-term and short-term performance, which underscores the advantages of a long-term investment approach.

## 2. Structure of the Indian Equity Market

The Indian equity market functions through two main stock exchanges: the Bombay Stock Exchange (BSE), founded in 1875 as Asia's first stock exchange, and the National Stock Exchange (NSE), established in 1992. The NSE, with its entirely electronic trading platform, transformed the market by bringing in transparency, efficiency, and accessibility. These two exchanges together provide a platform for trading equities, derivatives, and other financial products, with a combined market capitalization of over USD 4 trillion.

The market is divided into three broad categories according to market capitalization: large-cap, mid-cap, and small-cap stocks. Large-cap stocks, commonly known as blue-chip stocks, hold sway in the market in terms of liquidity and impact. Mid-cap and small-cap stocks, though riskier, provide higher growth opportunities, appealing to a different group of investors. Indian equity market is also dominated by foreign institutional investors (FIIs), domestic institutional investors (DIIs), and increasingly large pool of retail investors, especially since the COVID-19 pandemic (Ram & Shirodkar, 2015) [3].

### 2.1 The Role of Indices in the Indian Equity Market

Indices are the driving force behind the Indian equity market's operation. Indices act as a benchmark for gauging the performance of a particular segment of the market, giving investors an idea of the overall direction of the market. Indices are formed by taking a basket of stocks chosen on the basis of pre-defined criteria like market capitalization, liquidity, and sector representation. They serve as surrogates for the overall market, allowing investors to measure economic conditions, sectoral performance, and investor sentiment (Singh & Thaker, 2012) [4].

**In India, indices are generally classified into three categories:-**

1. **Broad Market Indices:** These reflect the overall market and contain a wide range of stocks in various sectors. They include the Nifty 50 and the BSE Sensex.
2. **Sectoral Indices:** These monitor the performance of a particular sector, like banking, IT, or energy. Examples are the Nifty Bank Index and the BSE IT Index.
3. **Strategy and Thematic Indices:** These aim to represent a given investment theme or strategy, e.g., ESG (Environmental, Social, and Governance) or low-volatility stocks. Some examples are the Nifty100 ESG Index and the Nifty Alpha 50.

### 2.2 The Significance of the Nifty 50 Index

The Nifty 50 index holds unparalleled significance in the Indian equity market as a diversified benchmark comprising 50 of the largest and most liquid stocks on the National Stock Exchange (NSE), representing approximately 65% of its free-float market capitalization. Introduced in 1996, it serves as a vital indicator of the Indian economy's performance and is widely used by investors, fund managers, and policymakers for various purposes. These include benchmarking the performance of mutual funds and portfolios, serving as the underlying index for highly liquid derivative products like futures and options, and facilitating passive investing through index funds and Exchange Traded Funds (ETFs) that track its performance. Additionally, the Nifty 50 is regarded as a key economic indicator, with its trends often reflecting broader economic movements, making it an essential tool for analysts and policymakers in assessing market and economic conditions.

## 3. Results and Discussion

Since its creation, the Nifty 50 has developed alongside the Indian economy and equity market. It has progressed from being dominated by old-school industries such as manufacturing and energy to depicting the growth of new-age industries like information technology, financial services, and consumer goods. This transformation highlights the flexibility of the index to continue being relevant in a fast-changing economic environment.

**Table 1:** Nifty 50 attributes across years

| Attributes (%) | 2024^ | 2019 | 2014 | 2009 | 2005 | 1995 |
|---|---|---|---|---|---|---|
| Market Representation by Full MCAP (%) * | 47.35% | 58.55% | 59.00% | 59.15% | 57.90% | 33.70% |
| Market Representation by Average Turnover (%) * | 28.34% | 56.01% | 43.89% | 52.39% | 42.20% | 62.20% |
| Cumulative weight of top five stocks (%) | 39.00% | 41.34% | 34.19% | 38.47% | 38.50% | 31.70% |
| Cumulative weight of bottom five stocks (%) | 3.00% | 2.00% | 1.78% | 2.26% | 2.00% | 1.80% |

Table 1 lays the groundwork for an in-depth discussion of the Nifty 50's history and its far-reaching influence on the Indian equity market, as explained in the following sections of this research article. The data presents a holistic view of the movement of the Nifty 50 index during almost three decades, from 1995 to 2024. The analysis is important for recognizing the evolving nature of the Nifty 50 and its place in the Indian equity market. The Nifty 50's coverage of the aggregate market capitalization of the NSE has exhibited an erratic trend during the years.

Between 1995 and 2009, the index has always reflected approximately 57-59% of the market. But by the year 2024, the representation has come down to 47.35%. This shows that even though Nifty 50 is a powerhouse, the Indian equity market has grown considerably with the rise of mid-cap and small-cap stocks. This is a sign that the market has matured and new industries and businesses are coming up outside the old universe of large caps. The representation of the average turnover of the Nifty 50 has varied considerably over time. In 1995, it represented 62.20% of the market turnover, reaching a high of 56.01% in 2019, before falling to 28.34% in 2024. This fall reflects a shift in trading activity towards non-Nifty 50 stocks, specifically mid-cap and small-cap stocks.

This phenomenon might be explained by growing investor demand for high-growth opportunities beyond the large-cap universe, along with the proliferation of thematic and sectorial investing. The aggregate weight of the top five shares in the Nifty 50 has been more or less stable, fluctuating between 31.70% (1995) and 41.34% (2019). In 2024, it is 39.00%, down slightly from 2019. It points to stability and the ongoing dominance of a couple of giant companies in the index. But the minor decline reflects a trend towards gradual diversification within the index itself, with other stocks becoming relatively more important, possibly due to the breakout of new sector leaders and rebalancing of the index. The aggregate weightage of the weakest five stocks has been consistently below par, registering between 1.78% (2014) and 3.00% (2024). The implication is that the least weighted constituents of Nifty 50 have little say in the total index performance. The stable but low weight betrays the weight of influence exercised by the greater constituents of the index, typical of market-capitalization-weighted indices. This marginal rise to 3.00% in 2024 may reflect an infinitesimal slant towards better inclusivity across the index. The breakdown of the Nifty 50's characteristics presents key insights into the development of the Indian equity market.

The reduction in the index's coverage of total market capitalization and turnover reflects increasing diversification in the market, with mid-cap and small-cap stocks becoming increasingly prominent.

Though the stable aggregate weight of the top five shares is evidence of the ongoing supremacy of large-cap organizations, the marginal reduction indicates a slow drift towards an evenly balanced index structure. Investor attitudes have also changed, with more attention to mid-cap and small-cap stocks for better returns, altering portfolio strategies. The Nifty 50 has evolved to mirror economic shifts, adding new sectors and firms, but still retains exposure to a small number of major players, creating concentration threats. In the future, though the Nifty 50 will continue to be an essential benchmark, its relative significance could be eroded by market growth, which will call for a more sophisticated approach to index building and benchmarking.

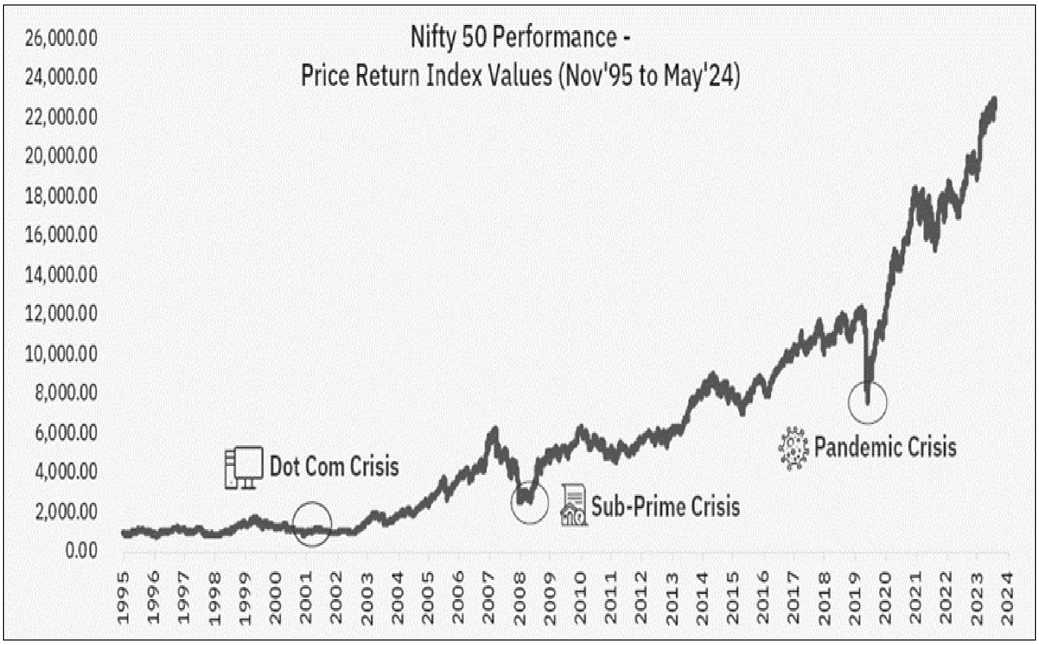


**Fig 1:** Performance of Nifty 50 since inception

The graph 1 illustrating the performance of the Nifty 50 from its launch in November 1995 to May 2024 indicates a steep rise, indicating the Indian equity market's strong growth. The periods of downturn, including the Dot Com Crisis (2000-2001), the Sub-Prime Crisis (2008), and the Pandemic Crisis (2020), indicate the sensitivity of the index to global and domestic shocks. Yet, the Nifty 50 has been resilient throughout, bouncing back rapidly from these setbacks and hitting new highs, especially after 2020. This rapid growth in recent times can be traced to economic reforms, foreign investment inflows, and expanding retail investor participation. The overall trend points to the index's status as a gauge of the health of the Indian economy and its long-term prospects, offering useful inputs for investors and policymakers alike.

**Table 2:** Annualized return and volatility profile of Nifty 50 TR index

| Period | Returns | Volatility | Return to Risk |
|---|---|---|---|
| Since Inception (June 30, 1999) | 14.10% | 22.25% | 0.63 |
| 15 years | 15.63% | 18.05% | 0.87 |
| 10 years | 14.16% | 16.48% | 0.86 |
| 7 years | 14.93% | 17.21% | 0.87 |
| 5 years | 15.28% | 19.07% | 0.8 |
| 3 years | 16.31% | 13.71% | 1.19 |
| 1 year | 30.08% | 9.77% | 3.08 |

Table 2 shows the annualized return and volatility picture of the Nifty 50 Total Return (TR) index as of March 31, 2024, for different time frames. For the period since its launch in June 1999, the Nifty 50 has earned a return of 14.10% per annum with a volatility of 22.25%, yielding a return-to-risk ratio of 0.63. On shorter horizons, the index has performed better, with returns rising to 15.63% over 15 years and a high of 30.08% over the previous year. Interestingly, the return-to-risk ratio has also correspondingly improved to 3.08 for the one-year horizon, signaling more returns for every unit of risk. This pattern implies that although Nifty 50 has always recorded strong returns, the past couple of years witnessed better performance along with less volatility, which symbolizes a solid and effective market scenario. This data emphasizes how resilient and well-suited this index is to be invested long-term, especially in light of bettering risk-adjusted return.

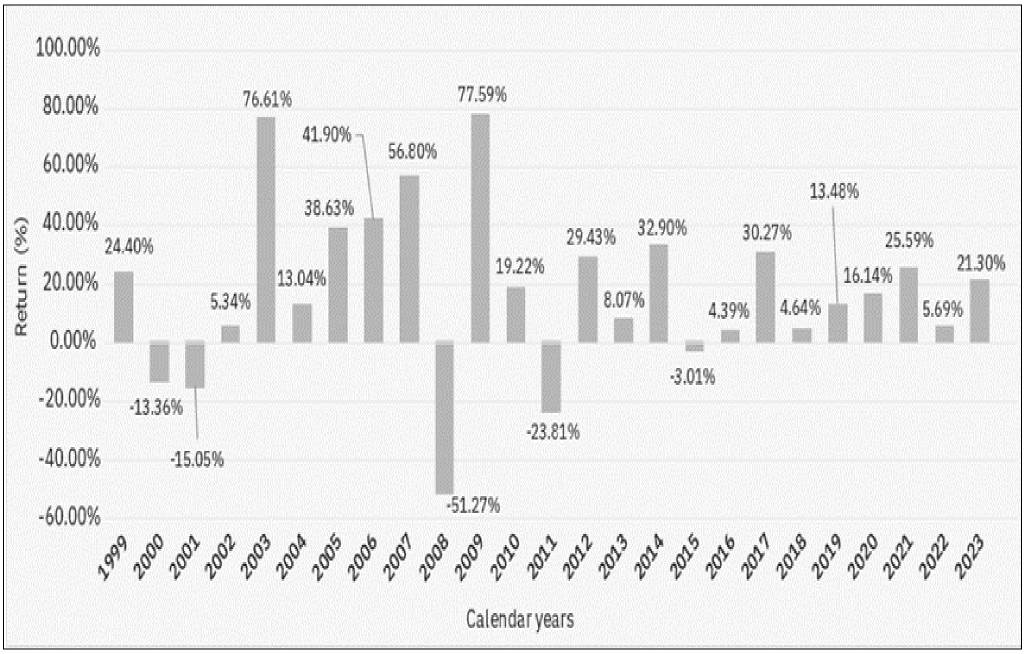


**Fig 2:** Calendar year performance of Nifty 50 TR index

The graph 2 displays the calendar year performance of the Nifty 50 Total Return (TR) index, highlighting extreme variations in returns throughout the years. The index has seen times of high growth, with high peaks like 76.61% and 41.90%, indicating strong market performance in those years. Yet it has also seen steep declines, with returns dropping to -51.27% and -25.59% in tougher times. These swings reflect the volatility of the Indian equity market, driven by domestic and international economic factors. Even with the volatility, the general trend is one of resilience, with the index bouncing back from declines and providing positive returns in later years. This trend points to the value of a long-term investment mindset when looking at the Nifty 50, as it has shown the capacity to bounce back and provide large returns over the long term. The information is helpful in understanding the cyclical movement of the market and the ability to recover and grow even after the market has fallen sharply.

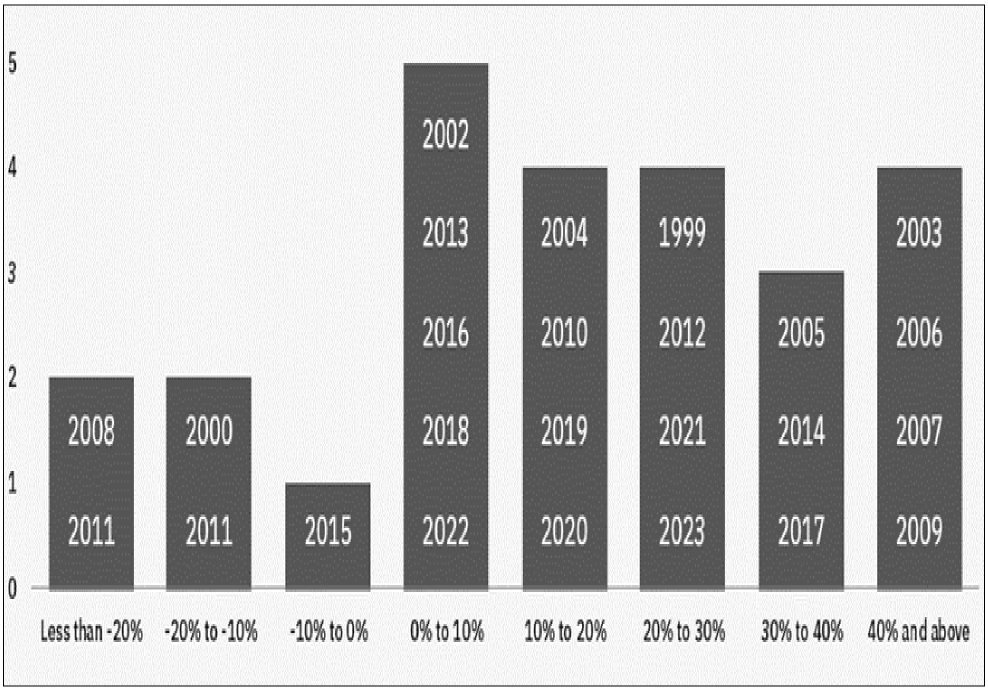


**Fig 3:** Calendar year returns range of Nifty 50 TR index

Figure 3 shows the range of calendar year returns of the Nifty 50 Total Return (TR) index, splitting yearly performance into various return brackets. The index has seen a vast array of results over the years, ranging from high losses (below -20%) to huge gains (40% and more). Interestingly, years such as 2008 and 2022 are in the negative return brackets, showing times of economic slumps and market instability. On the other hand, years like 2009, 2014, and 2021 demonstrate high positive returns, depicting solid market recovery and growth cycles. The dispersion of returns speaks about the cycle in the Indian equity market where volatility is often high followed by sharp recoveries. This tendency points to a need to have a grasp over the market cycle and a long-term investment mind while going through the phases of uncertainty and cashing in the opportunities of growth. The data offers insightful information about the past performance trends of the Nifty 50, highlighting its strength and capability to deliver sizeable returns in the long run.

**Table 3:** Daily rolling return analysis of the Nifty 50 TR index

| Investment Horizon | Percentage of total instances | | | | | | Return Analysis | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Negative Returns | Positive Returns | | | | | Return Attributes | | | |
| | <0% CAGR | >=0% CAGR | 0-5% CAGR | 5-10% CAGR | 10-15% CAGR | >15% CAGR | Min CAGR | Max CAGR | Median CAGR | Average CAGR |
| 10 years | 0.00% | 100.00% | 0.00% | 16.90% | 41.50% | 41.60% | 5.13% | 22.39% | 14.24% | 14.20% |
| 7 years | 0.00% | 100.00% | 0.00% | 17.30% | 45.60% | 37.00% | 4.90% | 30.48% | 13.57% | 14.93% |
| 5 years | 0.10% | 99.90% | 5.80% | 21.50% | 36.30% | 36.40% | -1.03% | 47.21% | 13.34% | 15.33% |
| 3 years | 6.80% | 93.20% | 9.00% | 18.10% | 23.80% | 42.30% | -15.22% | 62.12% | 13.35% | 15.33% |
| 2 years | 18.00% | 82.00% | 9.90% | 13.10% | 13.20% | 45.80% | -20.99% | 64.76% | 13.48% | 15.09% |
| 1 year | 23.90% | 76.10% | 9.00% | 10.20% | 11.90% | 44.90% | -55.38% | 107.92% | 13.01% | 16.29% |

The Nifty 50 Total Return (TR) index's daily rolling return analysis for the period from June 30, 1999, to March 28, 2024, captures the overall picture of the index's performance on different investment timelines. The statistics indicate that the Nifty 50 has returned positively in about 93% of instances on a 3-year timeline, and the frequency improves to almost 100% on longer time frames of 7 and 10 years. This emphasizes the index's strength and ability to produce returns consistently over a long-term timeframe. For example, on a 10-year horizon, the index has an average Compound Annual Growth Rate (CAGR) of 14.20%, with returns between a low of 5.13% and a high of 22.39%. Likewise, on a 7-year horizon, the average CAGR is 14.93%, with returns above 15% per annum in 37% of the cases. The 5-year time horizon also demonstrates strong performance, with an average CAGR of 15.33% and returns over 15% per year in 36.4% of instances.

But the analysis also points to growing unpredictability in shorter time horizons. For 1-year and 2-year time frames, the index is more volatile, with 23.9% and 18% of instances, respectively, ending in negative returns. Despite this, the median and average CAGRs remain relatively stable across all horizons, indicating consistent long-term performance. This data suggests that while short-term investments in the Nifty 50 may be subject to market fluctuations and potential downturns, long-term investments are more likely to yield positive and stable returns. The results highlight the value of a long-term investment approach while considering the Nifty 50, given that it has shown a good history of generating strong returns over the long term, and thus it is a good benchmark for the performance of equity markets in India.

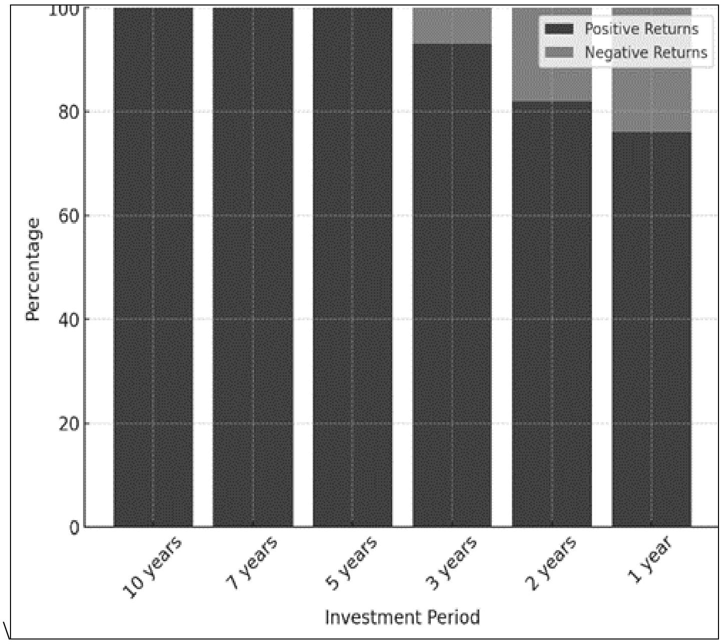


**Fig 4:** Proportion of positive and negative return by investment horizon

**Table 4:** Chi-Square test for independence

| Statistic | Value |
|---|---|
| Chi-Square Value | 73.18048817 |
| Degrees of Freedom | 5 |
| P-Value | 2.23E-14 |

Chi-Square test as given in Table 4 indicates a significant shift in the ratio of positive to negative returns across a number of investment horizons. With a Chi-Square statistic of 73.18 and a very low p-value ($2.23 \times 10^{-14}$), the null hypothesis strongly rejected. This suggests that consistency of returns is highly dependent on investment horizon. Distant investment horizons (5, 7, and 10 years) particularly indicate a 100% chance of positive returns; short-term investments (1-3 years) indicate an increased possibility of negative returns. The tendency highlights the benefits of long-term investment, whereby the possibility of losses decreases with time. Investors seeking stability and consistent good returns should consider holding assets for longer periods rather than opting for short-term schemes, which involve greater likelihood of poor performance.

## Recommendations
Following the analysis of the Nifty 50 Total Return (TR) index's performance across various investment horizons, several practical recommendations can guide investors toward achieving their financial goals. First, adopting a long-term investment horizon is crucial, as the Nifty 50 has delivered positive returns nearly 100% of the time over 7-year and 10-year periods, helping mitigate short-term volatility. Diversifying your portfolio across sectors, asset classes, and market caps, including mid-caps, small-caps, bonds, and global equities, can further reduce risk and enhance returns. During market downturns, it is advisable to remain invested, as the Nifty 50 has historically recovered from declines and delivered strong long-term returns. Systematic Investment Plans (SIPs) in Nifty 50 index funds or ETFs can help retail investors benefit from rupee cost averaging and reduce the impact of market fluctuations. Regularly rebalancing and monitoring your portfolio ensures alignment with your risk tolerance and financial objectives, while focusing on quality stocks with strong fundamentals, stable earnings, and sound management can enhance returns. Additionally, investors should be mindful of tax implications, structuring investments to maximize after-tax returns, and consider seeking professional guidance from financial advisors or wealth managers to develop customized strategies tailored to their goals and risk appetite. By implementing these strategies, investors can navigate the complexities of the equity market and improve their chances of achieving long-term financial success.

## Conclusion
The Nifty 50 Total Return (TR) index is a reliable benchmark for long-term equity investments in India, consistently delivering positive returns over extended periods, with nearly 100% success rates over 7-year and 10-year horizons. While short-term investments exhibit higher volatility and a greater likelihood of negative returns, the index demonstrates stable long-term growth, as evidenced by consistent median and average CAGRs across all horizons. The Chi-Square test confirms that long-term investments significantly reduce the risk of losses. The Nifty 50's evolution and adaptability reflect broader economic trends, making it a vital tool for benchmarking, derivatives trading, and passive investing. For investors, adopting a long-term strategy, diversifying portfolios, utilizing SIPs, and focusing on quality stocks are key to mitigating volatility and maximizing returns. The study underscores the importance of a disciplined, long-term approach to equity investment, offering a framework for informed decision-making in the Indian market.

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