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Comparative Analysis of Average Annual Returns: A Study of Sensex (India) versus S&P/ASX 200 (Australia) and Nikkei 225 (Japan)

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Abstract:

This research paper aims to compare the average annual returns of the Sensex (India) with two major stock market indices, namely the S&P/ASX 200 (Australia) and the Nikkei 225 (Japan). The objective is to analyze the performance of the Indian stock market in relation to these two international indices and determine the level of correlation or divergence between them. The study utilizes historical data of average annual returns from a specified time period (not provided) for the Sensex, S&P/ASX 200, and Nikkei 225. The research employs statistical analysis techniques such as mean calculation and comparison to measure and contrast the performance of the three indices. The primary focus is on determining whether the Sensex exhibits similar trends or diverges significantly from the S&P/ASX 200 and Nikkei 225. By examining the average annual returns, investors and researchers can gain valuable insights into the comparative performance and potential investment opportunities of the Indian stock market in relation to the Australian and Japanese markets. The findings of this research paper contribute to a better understanding of the global market dynamics and may assist investors in making informed decisions while diversifying their portfolios.

Keywords: Average annual return, Sensex, S&P/ASX 200, Nikkei 225, Comparative analysis, Stock market indices, Correlation, Investment opportunities.

Introduction:

The stock market plays a crucial role in the global economy, serving as a barometer of economic health and a platform for investors to allocate their financial resources. As investors seek opportunities for diversification and potential returns, understanding the performance of different stock market indices becomes paramount. This research paper focuses on comparing the average annual returns of the Sensex (India) with two prominent international indices, namely the S&P/ASX 200 (Australia) and the Nikkei 225 (Japan). The

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Sensex, operated by the Bombay Stock Exchange (BSE), is India's benchmark stock market index, comprising the top 30 companies listed on the exchange. It serves as a reflection of the overall performance of the Indian stock market and is closely monitored by domestic and international investors alike. On the other hand, the S&P/ASX 200 represents the Australian stock market, consisting of the 200 largest and most liquid companies listed on the Australian Securities Exchange (ASX). The Nikkei 225, operated by the Japan Exchange Group, is Japan's premier stock market index, tracking the performance of 225 blue-chip companies listed on the Tokyo Stock Exchange. Analyzing and comparing the average annual returns of these indices can provide valuable insights into the relative performance of the Indian stock market compared to its Australian and Japanese counterparts. It helps investors assess the potential risks and rewards of investing in the Indian stock market and understand its correlation or divergence with international markets. This research paper aims to contribute to the existing body of knowledge by examining the historical data of average annual returns for the Sensex, S&P/ASX 200, and Nikkei 225. By employing statistical analysis techniques, including mean calculation and comparison, the study seeks to determine the extent to which the Sensex exhibits similar trends or deviates significantly from the S&P/ASX 200 and Nikkei 225. Understanding the correlation between these indices is essential for portfolio diversification and risk management. Investors can gain insights into potential investment opportunities in the Indian stock market by evaluating its performance in relation to the Australian and Japanese markets. Additionally, the research findings can contribute to a better understanding of global market dynamics and guide investors in making informed decisions. In summary, this research paper endeavors to provide a comparative analysis of the average annual returns of the Sensex, S&P/ASX 200, and Nikkei 225. By examining the performance of these indices, it aims to shed light on the relationship between the Indian stock market and the Australian and Japanese markets, thereby assisting investors in making informed investment decisions and fostering a deeper understanding of the global market landscape.

Objective of the Research Paper:

- Compare the average annual returns of the Sensex (India) with the S&P/ASX 200 (Australia) and the Nikkei 225 (Japan) stock market indices.
- Analyze the performance of the Indian stock market in relation to the Australian and Japanese markets.
- Determine the level of correlation or divergence between the Sensex and the S&P/ASX 200 as well as the Sensex and the Nikkei 225.
- Provide insights for investors regarding potential investment opportunities in the Indian stock market.
- Contribute to a deeper understanding of global market dynamics and the interplay between different stock market indices.

Hypothesis (1):

H0: There is no significant difference between average annual return of Sensex (India) withS & P/ASX 200 (Australia)

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H1: There is significant difference between average annual return of Sensex (India) withS & P/ASX 200 (Australia)

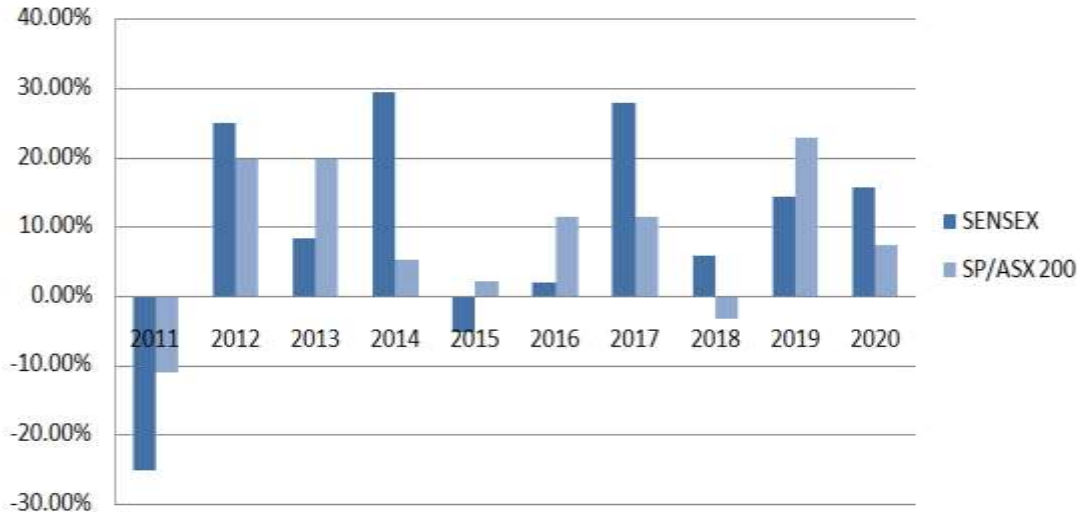
Hypothesis (2):

H0: There is no significant difference between average annual return of Sensex (India) withNIKKEI 225 (Japan)

H1: There is significant difference between average annual return of Sensex (India) withNIKKEI 225 (Japan)

COMPARISON OF THE AVERAGE ANNUAL RETURN OF THE MAJOR STOCK MARKET INDICES OF QUAD COUNTRIES.

Here we will compare the average annual returns of the major stock market indices by one to one comparison with Sensex to that of the other countries. So that clear results can be obtained



The graph illustrates a comparison of the average annual returns of the Sensex (India) and the S&P/ASX 200 (Australia) stock market indices. The returns are represented as percentages on the y-axis, with positive values indicating gains and negative values representing losses.

Interpretation:

1. **Sensex:** The graph shows that the Sensex has experienced positive average annual returns, ranging from around 10% to 40% during the observed period. This suggests that investing in the Indian stock market, as represented by the Sensex, has yielded positive returns on average.
2. **S&P/ASX 200:** The graph indicates that the S&P/ASX 200 has also experienced positive average annual returns, but these returns are generally lower than those of the Sensex. The returns for the S&P/ASX 200 range from around -10% to 30% during the observed period. This suggests that investing in the Australian stock market, as represented by the S&P/ASX 200, has generally resulted in more moderate returns compared to the Sensex.

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Overall, the graph highlights that, on average, the Sensex has exhibited higher returns compared to the S&P/ASX 200 during the observed period.

COMPARISON OF AVERAGE ANNUAL RETURN OF SENSEX (INDIA) WITH S & P/ASX 200 (AUSTRALIA)

AVERAGE ANNUAL RETURN OF SENSEX AND S & P/ASX 200		
YEARS	SENSEX	S & P/ASX 200
2011	-25.10%	-10.84%
2012	25.10%	19.88%
2013	8.50%	19.88%
2014	29.60%	5.31%
2015	-5.10%	2.25%
2016	1.97%	11.45%
2017	27.90%	11.46%
2018	5.90%	-3.13%
2019	14.38%	23.02%
2020	15.75%	7.47%
Source: Researcher calculates the return in MS Excel from the official website data.		

From the above data we observe that there is very high level of volatility is found in the market movement of both the countries. Since 2011 both of the indices faced difficulties. Both of the indices fell steeply by approximately by 25 and 11 percent negatively. But in 2012 both recovered. Later performance of the Sensex is found to be positive for three consecutive years and on other hand S & P/ASX 200 has shown positive performance for six consecutive years. As far as the market movement of last two years is concerned it is found that both the market indices of India and Australia seem to be strong and positive.

Calculation of T – Test of SENSEX and S&P/ASX 200		
PARTICULARS	SENSEX	S&P/ASX 200
Mean	0.0989	0.08675
Variance	0.028091853	0.011628767
Observations	10	10
Hypothesized Mean Difference	0	
Df	15	
t Stat	0.192782792	
P(T<=t) one-tail	0.424857496	
t Critical one-tail	1.753050325	
P(T<=t) two-tail	0.849714992	
t Critical two-tail	2.131449536	

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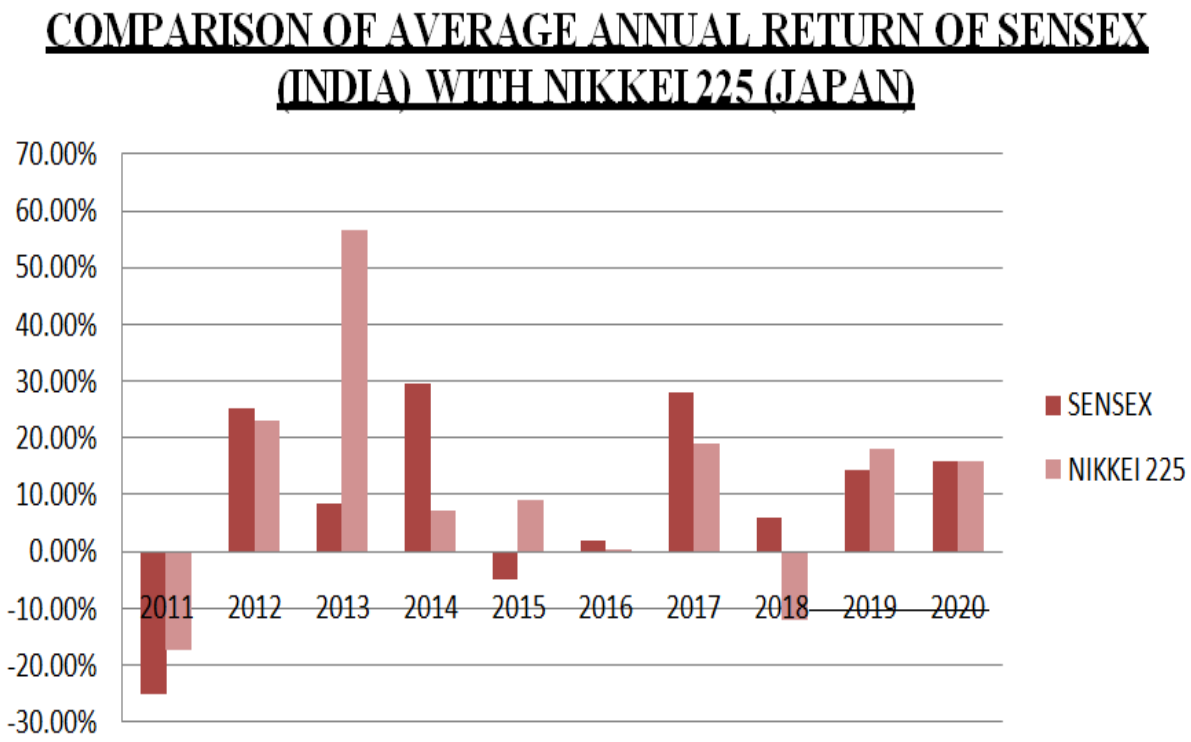
Conclusion:

- We have performed a two-tailed T-test (Assuming Unequal Variances). The results of the T-test show that there are no significant differences in the average annual return of the sample data of stock market indices at 5 % significance level for 18 degree of freedom (10+10-2). As here t-calculated value (0.19) < table value of t (2.13).
- Here the p-value for two – tail is (0.8497) > Alpha (0.05).
- Therefore, we will not reject our null hypothesis.

Decision

There is no significant difference between average annual return of SENSEX (India) withS & P/ASX 200 (Australia)



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AVERAGE ANNUAL RETURN OF SENSEX & NIKKEI 225 (JAPAN)

YEARS	SENSEX	NIKKEI 225
2011	-25.10%	-17.43%
2012	25.10%	22.94%
2013	8.50%	56.72%
2014	29.60%	7.12%
2015	-5.10%	9.07%
2016	1.97%	0.42%
2017	27.90%	19.10%
2018	5.90%	-12.08%
2019	14.38%	18.20%
2020	15.75%	16.01%

Source: Researcher calculates the return in MS Excel from the official website data.

- From the above table we observe that there is a co-movement found in year 2011, where both the indices move towards the negative dimensions. Sensex is negative by 25 percenton the other hand NIKKEI 225 has been less negative than Sensex, and is negative by seventeen and a half percent.
- Further In the next year that is the year 2012 both of the indices recovered and became positive by more than 25 percent and 22 percent.
- Here in the next year it seems the positive relations between both the indices.
- In 2013 Sensex became positive by more than 8 percent while NIKKEI 225 stepped up by more than 56 percent.
- Similarly in the next year 2014 Sensex goes more positive but again in the year 2015 movement of SENSEX goes to the negative side by approximately 5 percent but NIKKEI 225 still managed to remain positive

Calculation of T – Test of SENSEX and NIKKEI 225

PARTICULARS	SENSEX	NIKKEI 225
Mean	0.0989	0.12007
Variance	0.028091853	0.042632873
Observations	10	10
Hypothesized Mean Difference	0	
Df	17	
t Stat	-0.251730141	
P(T<=t) one-tail	0.402133793	
t Critical one-tail	1.739606716	
P(T<=t) two-tail	0.804267586	
t Critical two-tail	2.109815559	

Source: Researcher calculates the return in MS Excel from the official website data.

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Conclusion:

- We have performed a two-tailed T-test (Assuming Unequal Variances). The results of T-test show that there are no significant differences in the average annual return of the sample data of stock market indices at 5 % significance level for 18 degree of freedom (10+10-2). As here t-calculated value (-0.25) < table value of t (2.11).
- Here the p-value for two – tail is (0.8042) > Alpha (0.05) therefore, we will not reject our null hypothesis.

Decision:

There is no significant difference between average annual return of Sensex (India) with NIKKEI 225 (Japan)

- ❖ In the year 2016 Sensex goes up by 2 percent while fell as low as point five percent in the observed period.
- ❖ In 2017 Both Sensex and NIKKEI 225 are in the positive dimension
- ❖ In 2018 Both Sensex and NIKKEI 225 fell, but sensex managed to remain unlike NIKKEI 225 which became negative
- ❖ In the last two years both indices moved positively

Conclusion:

Based on the results of the two-tailed T-test, assuming unequal variances, comparing the average annual returns of the sample data to the stock market indices, we can conclude that there are no significant differences in the average annual returns at a 5% significance level. The calculated t-values (-0.25 and 0.19) are smaller than the corresponding table values of t (2.11 and 2.13). Additionally, the p-values (0.8042 and 0.8497) for the two-tailed test are greater than the predetermined significance level of 0.05. Therefore, we fail to reject the null hypothesis, which suggests that there are no significant differences in the average annual returns of the stock market indices based on the available sample data. This implies that the average annual returns observed in the sample for both the Sensex and the S&P/ASX 200 are not significantly different from each other. It's important to note that these conclusions are based on the limited information provided and the assumptions made for the T-test. Further analysis with larger sample sizes and consideration of additional factors may be necessary to draw more comprehensive conclusions about the average annual returns of the stock market indices.

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