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**An Analytical Report on the Trend Movement of a Key
Indicator of the Global Economy**

An Analytical Report Submitted in Contribution to 100% Module Assessment

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Assignment Title:

An Analytical Report on the Trend Movement of a Key Indicator of the Global Economy

“I, Cheung Siu To (Student number: 2322639), certify this work is the result of my own investigations, except where otherwise stated. All references have been duly cited”

Signed:  _____

Date: March 7, 2024

Synopsis

This article reports an empirical study on the trend movement of major stock market indexes in Hong Kong, United States, Japan, China, and India with a hope to explore investment opportunities for the company to expand its global business. Based on a comprehensive statistical analysis of historical data and trends of these stock market indexes to identify patterns and potential growth areas, the findings reveal the volatility and trends in these markets. We recommend diversifying investment portfolios and focusing on high growth potential to mitigate risks and capitalize on emerging opportunities in these key markets.

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1. Introduction

The economic challenges in Hong Kong have persisted in recent times, with a downward trend observed in economic performance. For example, the decline in gross domestic product (GDP) due to the weak performance in external trade, as reported by the government (SCMP, 2023). Furthermore, the Hong Kong Monetary Authority has posted a record investment loss of HK\$202.4 billion (\$25.8 billion) in 2022 (Hong Kong Monetary Authority, 2023). Adding to the concerns, the Hang Seng Index, a crucial stock market indicator, has experienced a downward trajectory for four consecutive years, with a 14% decline in 2023, closing at 17,047.39 (The Wall Street Journal, 2023).

Given the prevailing uncertainties in Hong Kong's economic and financial environment, our company has encountered significant losses in financial assets, with a reported decline of 20% within these 5 years. To mitigate risks and diversify our portfolio, expanding our investments globally has become imperative. This strategic move will reduce our reliance on a single location and enable us to spread our risks, while also presenting opportunities for growth and resilience.

This expansion aligns perfectly with our company's long-term vision and commitment to sustainability. By diversifying our investment areas across different regions, we position ourselves for sustained growth, stability, and success in the ever-changing global economic landscape. To address these challenges head-on, this comprehensive report will delve into specific countries, evaluating their economic performance through an in-depth analysis of their major stock market indexes.

To conduct this analysis, we employed simple statistical methods to facilitate an empirical study of the trend movements of key stock market indexes in Hong Kong, the United States, Japan, China, and India. The primary objective is to identify potential investment opportunities for our company's global expansion. By carefully examining the performance and trends of these indexes, we aim to uncover valuable insights, including similarities, differences, and potential correlations. Factors such as economic conditions, geopolitical events, and policy changes will be carefully considered to gain a comprehensive understanding of the market dynamics in each country.

The analysis commences with a comprehensive introduction to the selected indicators to provide a solid foundation for the subsequent comparison of their performance. the official datasets cover the

period from 2000 to end of 2023 to allow for a thorough statistical analysis of the trend movements from both global and local perspectives. Based on these insights, along with future predictions, the report concludes with strategic recommendations for investment choices, aiming to guide our company towards optimal decisions in the ever-evolving global investment landscape.

2. Research Background

Stock market indexes used as economic indicators to track the overall level and direction of price movements in financial instruments such as stocks, bonds, and money market instruments (Shilling, 1996). These indexes serve as statistical tools and benchmarks for measuring market performance. Thus, the stock market index is an appropriate economic indicator for this research study. By considering the stock market index, we are able to gain insights into the overall economic health and growth potential of different countries, aiding us in making well-informed decisions regarding investment opportunities. Besides, China, India, Japan, and the United States to compare the performance with Hong Kong because of their significant influence on the global economy and their unique economic relationships with Hong Kong.

2.1. Data definition and Sources

This research report focuses on studying major stock market indexes from Hong Kong, China, India, Japan, and the United States. Each location has distinct stock market indexes that represent various industries, assets, and services. Specifically, the chosen stock market indexes for this research are the Hang Seng Index (HSI) for Hong Kong, SSE Composite Index for China, S&P BSE SENSEX for India, Nikkei 225 for Japan, and S&P 500 for the United States. These indexes were selected based on their representativeness of the respective stock markets in each location. The analysis of these specific indexes means to gain insights into the performance and fluctuations of the stock markets in these regions.

The Hang Seng Index (HSI) holds a prominent position as one of the earliest stock market indexes in Hong Kong. It focuses specifically on the largest and most liquid stocks that are traded on the Hong Kong Exchange (HKEx). As of December 2023, the index comprised 82 constituents, representing approximately 65% of the total market capitalization. It encompasses various sectors including finance, utilities, properties, and commerce and industry (Hang Send Indexes, n.d.) (Hang Send Indexes, 2024).

The S&P 500® is widely acknowledged as the primary benchmark for measuring the performance of large-cap U.S. stocks. It consists of 500 prominent companies and serves as a crucial tool for tracking the overall performance of U.S. stocks. This index represents around 80% of the total market capitalization and is widely regarded as one of the most reliable indicators for large U.S.

stocks and the broader equities market (S&P Dow Jones Indices, 2024) (Tretina, 2023).

The SSE Composite Index is composed of all eligible stocks and CDRs listed on the Shanghai Stock Exchange in China. Its purpose is to provide a comprehensive reflection of the overall market performance of the companies listed on the exchange. The index universe of the SSE Index includes all stocks and CDRs issued by red-chip enterprises listed on the Shanghai Stock Exchange (China Securities Index Co. Ltd, 2020).

The Nikkei 225 is globally recognized as the premier index for Japanese stocks. Due to its prominence, numerous financial products linked to the Nikkei 225 have been created and are traded worldwide. It serves as a reliable indicator of the movement of Japanese stock markets. The Nikkei 225 is a price-weighted equity index that comprises 225 stocks from the Prime Market of the Tokyo Stock Exchange (Nikkei Indexes -Nikkei 225 Official Site-, 2024).

The S&P BSE SENSEX is India's most widely monitored bellwether index. Its purpose is to measure the performance of the 30 largest, most liquid, and financially sound companies across key sectors of the Indian economy listed at BSE Ltd. The index covers over 40% of the total market capitalization of the listed universe at the Bombay Stock Exchange (BSE) in India (S&P Dow Jones Indices, 2024).

The market data utilized in this study were sourced from Yahoo Finance, a well-established and widely used financial platform known for its comprehensive range of services. Yahoo Finance offers real-time stock quotes, up-to-date news, portfolio management resources, and international market data. Annual data (start of each year) were chosen to capture the dynamics and variations within the stock market at a more granular level. By examining data, the study aims to better understand short-term trends, market reactions to events, and the influence of economic indicators.

2.2. Current performance of stock market indexes in the selected countries

Based on the latest available data, the stock market indexes of selected countries have shown the following trends:

The Hang Seng Index (HSI) has experienced a significant decline, losing over 25% of its value since its peak in August 2023 (Yahoo Finance, 2024). This downward trend is attributed to the

slowdown in China's economy, affecting many Chinese companies listed on the HSI (Dave Sebastian, 2024).

Foreign investments in Chinese stocks in 2023 saw over 75% of withdrawals, influenced by concerns over a liquidity crisis in the property sector and disappointing growth readings (Financial Times, 2023). The SSE Composite Index reached a certain level by the end of 2023. (Yahoo Finance, 2024).

In 2022, the S&P 500 experienced a decline of nearly 20% following the Federal Reserve's decision to raise interest rates quickly. However, in 2023, equity markets recovered some of the lost ground, with the S&P 500 reaching 4,845.65 (Yahoo Finance, 2024).

The Nikkei 225 reached its highest level at 36,286.71 at the end of 2023 (Yahoo Finance, 2024). The economic recovery of Japan from the COVID-19 pandemic, improvements in exports and corporate profits, and supportive monetary policies have contributed to the growth of the Japanese stock market (Weiheng Chen; Yuxuan Tan; Cameron Chui, 2023).

The S&P BSE Sensex reached 71,752.11 points at the end of 2023 (Yahoo Finance, 2024). India's continuous GDP growth, focused policies supporting economic growth, and increased investment have contributed to the growth of the Sensex (Rashmi Gupta, 2024).

2.3. Dataset

Table 1 The annual data (start of year January 1st) of major stock market indexes in Hong Kong (HSI), China (Shanghai Composite Index), India (S&P BSE Sensex), United States (S&P 500) and Japan (Nikkei 225): from 2000 to 2024 (Year start)

Year	Hong Kong HSI	China Shanghai Composite Index	India S&P BSE Sensex	United States S&P 500	Japan Nikkei 225
2000	15,532.34	1,535.00	5,205.29	1,394.46	19,539.70
2001	16,102.35	2,065.61	4,326.72	1,366.01	13,843.55
2002	10,725.30	1,491.66	3,311.03	1,130.20	9,997.80
2003	9,258.95	1,499.82	3,250.38	855.70	8,339.94
2004	13,289.37	1,590.73	5,695.67	1,131.13	10,783.61
2005	13,721.69	1,191.82	6,555.94	1,181.27	11,387.59
2006	15,753.14	1,258.05	9,919.89	1,280.08	16,649.82
2007	20,106.42	2,786.34	14,090.92	1,438.24	17,383.42
2008	23,455.74	4,383.39	17,648.71	1,378.55	13,592.47
2009	13,278.21	1,990.66	9,424.24	825.88	7,994.05
2010	20,121.99	2,989.29	16,357.96	1,073.87	10,198.04
2011	23,447.34	2,790.69	18,327.76	1,286.12	10,237.92
2012	20,390.49	2,292.61	17,193.55	1,312.41	8,802.51
2013	23,729.53	2,385.42	19,894.98	1,498.11	11,138.66
2014	22,035.42	2,033.08	20,513.85	1,782.59	14,914.53
2015	24,507.05	3,210.36	29,182.95	1,994.99	17,674.39
2016	19,683.11	2,737.60	24,870.69	1,940.24	17,518.30
2017	23,360.78	3,159.17	27,655.96	2,278.87	19,041.34
2018	32,887.27	3,480.83	35,965.02	2,823.81	23,098.29
2019	27,942.47	2,584.57	36,256.69	2,704.10	20,773.49
2020	26,312.63	2,976.53	40,723.49	3,225.52	23,205.18
2021	28,283.71	3,483.07	46,285.77	3,714.24	27,663.39
2022	23,802.26	3,361.44	58,014.17	4,515.55	27,001.98
2023	21,842.33	3,255.67	59,549.90	4,076.60	27,327.11
2024	15,485.07	2,788.55	71,752.11	4,845.65	36,286.71
Note: The indexes are reference to a baseline of 1/1/2000. Sources: Yahoo Finance HANG SENG INDEX Historical Data: https://finance.yahoo.com/quote/%5EHSI/history Nikkei 225 Historical Data: https://finance.yahoo.com/quote/%5EN225/history S&P 500 Historical Data: https://finance.yahoo.com/quote/%5EGSPC/history S&P BSE SENSEX Historical Data: https://finance.yahoo.com/quote/%5EBSEN/history/ SSE Composite Index Historical Data: https://finance.yahoo.com/quote/000001.SS/history					

Table 2 The annual rate of change of major stock market indexes in the selected countries: 2000 to end of 2024 (Year Start)

	Hong Kong	China	India	United States	Japan
Year	HSI	Shanghai Composite Index	S&P BSE Sensex	S&P 500	Nikkei 225
2000	0.00	0.00	0.00	0.00	0.00
2001	3.67	34.57	-16.88	-2.04	-29.15
2002	-30.95	-2.82	-36.39	-18.95	-48.83
2003	-40.39	-2.29	-37.56	-38.64	-57.32
2004	-14.44	3.63	9.42	-18.88	-44.81
2005	-11.66	-22.36	25.95	-15.29	-41.72
2006	1.42	-18.04	90.57	-8.20	-14.79
2007	29.45	81.52	170.70	3.14	-11.04
2008	51.01	185.56	239.05	-1.14	-30.44
2009	-14.51	29.68	81.05	-40.77	-59.09
2010	29.55	94.74	214.26	-22.99	-47.81
2011	50.96	81.80	252.10	-7.77	-47.60
2012	31.28	49.36	230.31	-5.88	-54.95
2013	52.77	55.40	282.21	7.43	-42.99
2014	41.87	32.45	294.10	27.83	-23.67
2015	57.78	109.14	460.64	43.07	-9.55
2016	26.72	78.35	377.80	39.14	-10.35
2017	50.40	105.81	431.30	63.42	-2.55
2018	111.73	126.76	590.93	102.50	18.21
2019	79.90	68.38	596.54	93.92	6.31
2020	69.41	93.91	682.35	131.31	18.76
2021	82.10	126.91	789.21	166.36	41.58
2022	53.24	118.99	1014.52	223.82	38.19
2023	40.62	112.10	1044.03	192.34	39.85
2024	-0.30	81.66	1278.45	247.49	85.71
Sources: Calculations using data from Table 1					

3. Analysis and Discussion

Upon acquiring the data from the source, we proceed to construct graphical representations to conduct an in-depth analysis of global trend movements within the timeframe spanning from 2000 to 2023, while also determining the annual rate of change. When examining Table 1, it becomes apparent that there are substantial value differences between the indexes right from the beginning of the dataset. Several factors contribute to these disparities. Firstly, each index has its own unique starting point, leading to variations in initial values. Additionally, indexes are often reported in their respective local currencies, making the value of an index susceptible to fluctuations in exchange rates when compared to indexes from other countries.

While plotting a time series graph of the selected stock indexes with their respective countries can offer insights into the trends, drawing direct conclusions can still be challenging. To facilitate comparability, the data were normalized by calculating the rate of change relative to the baseline date (January 1, 2000) (Table 2). This conversion aims to provide a clearer understanding of the trends among the indexes.

In this part, analysis will focus on the global trend and local trend time series in order to have an overview of the performance of selected indexes and identify any observable patterns. Our attention is specifically directed towards the preceding five-year period to focus on ongoing developments. This meticulous selection facilitates a thorough examination and comprehension of the emergent patterns during this interval. By examining these recent trends, we acquire invaluable insights into the present situation, enabling us to enhance our capacity to forecast the future economic performance of the designated nations.

3.1. Pattern of the global trend movement

Figures 1 and 2 present a comprehensive overview of the trends exhibited by stock market indexes in selected countries, clearly depicting both upward and downward movements within the chosen time range. Nevertheless, given the variations in index reference points across the indexes, a time plot of rate of changes referencing January 1, 2000, offers a more suitable approach for precise comparison among the selected indexes. This methodology ensures standardized evaluation, enabling a thorough analysis of their relative performance and facilitating a comprehensive understanding of the market dynamics.

Looking closer at Figure 2.1, the S&P BSE Sensex exhibits the most consistent upward trajectory. Starting from 2004, the index experienced a remarkable increase of over 1200% by the end of the selected timeframe. This sustained growth positions the S&P BSE Sensex as a standout performer among the selected indexes.

The S&P 500, following the S&P BSE Sensex, demonstrated a significant increase in value. From its lowest point in 2002 to its highest point at the end of 2023, the S&P 500 experienced an impressive surge of 247.49%. On average, the index saw an annual increase of 45.24%.

The Hang Seng Index (HSI) showcased a notable upward trend until 2018. It increased by 111.73% from its lowest point in 2001 to its highest point in 2018. However, starting from 2020, it experienced a steep downward trend, resulting in a loss of all the previous gains by the end of 2023. The HSI had a negative change of -0.3% compared to January 1, 2000.

Similarly, the Shanghai Composite Index experienced substantial growth. It soared by 191.27% from its lowest point in 2005 to its highest point in 2007. However, it subsequently fluctuated within the range of 80% to 120% returns until 2023, with significant downward fluctuations observed between 2011 and 2014. On average, the index had an annual growth rate of 67.19%. By the end of the selected timeframe, the return had stabilized at 81.66%.

On the other hand, the Nikkei 225 exhibited greater volatility during the chosen timeframe. Generally, it experienced negative changes from 2000 to 2017, but starting from 2017, it entered a positive and increasing upward trend. Despite fluctuations, the index managed an overall increase of 85.71% from its lowest point in 2002 to its highest point at the end of 2023.

In the analysis of the figures, it is evident that significant downturns occurred in the market during the periods of 2000-2002, 2008-2009, and 2020. These downturns were influenced by various factors that impacted global financial markets.

The first downturn, from 2000 to 2002, was primarily caused by the burst of the dot-com bubble in the United States stock market. This bubble was characterized by a rapid rise in the valuation of companies operating in the technology sector, particularly those involved in the internet and e-commerce. The high demand for these stocks drove their prices to astronomical levels, creating a

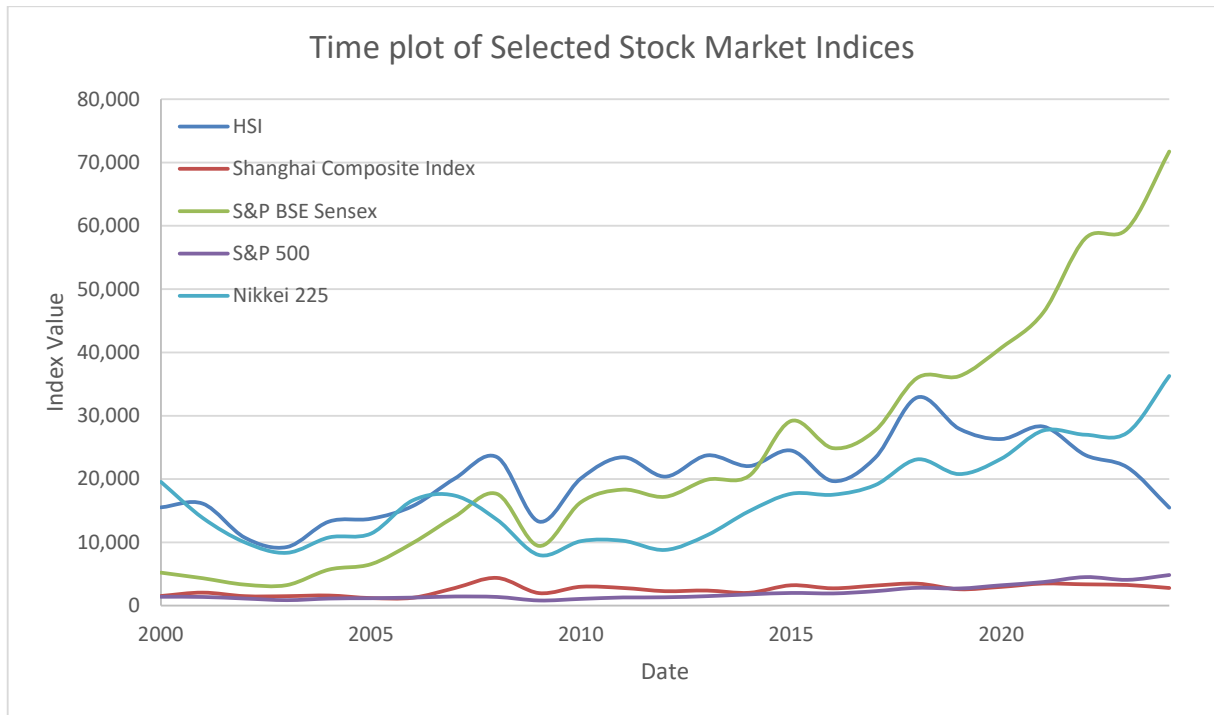
speculative frenzy (Ofek & Richardson, 2003). The burst of the dot-com bubble had a ripple effect on global financial markets due to their interconnectedness, international investments, contagion effects, and the influence of the technology sector. Investor sentiment and economic interdependencies further contributed to the widespread impact, leading to declines in stock prices worldwide.

The second significant downturn, from 2008 to 2009, was marked by the Global Financial Crisis. This crisis originated from the Housing Market Bubble, which was fueled by loose monetary policy and excessive leverage. Inadequate regulatory structures failed to prevent the buildup of risk, ultimately resulting in the bankruptcy of Lehman Brothers in September 2008 and triggering an international banking crisis (Claessens & Kose, 2010). The collapse of Lehman Brothers had severe repercussions on the global stock market, leading to a sharp decline in stock prices worldwide.

The third major downturn occurred in 2020 due to the outbreak of the COVID-19 pandemic. The pandemic caused a near cessation of economic activities, impacting all industries and service sectors. The suspension of economic activities, combined with the uncertainty and fear surrounding the virus, severely affected investor sentiment. The growing instability caused by the pandemic led to a sudden crash in stock markets across the world (Graeme Wearden, 2020).

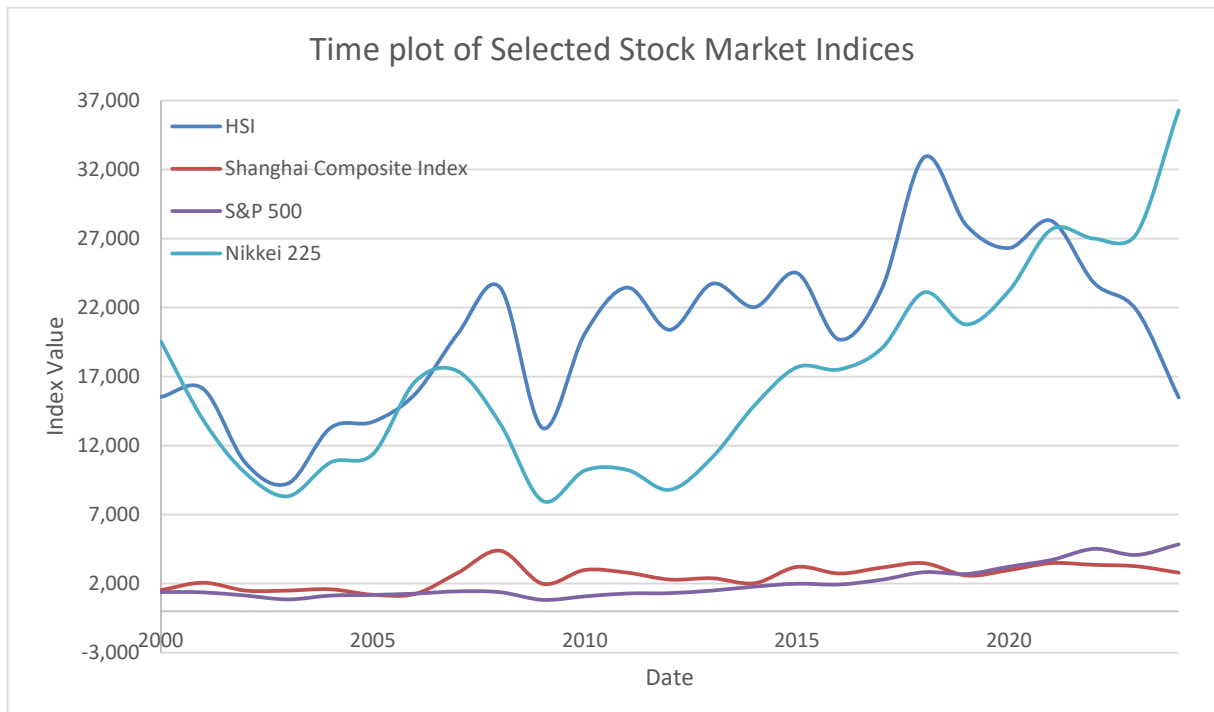
Despite these downturns, an analysis of the selected indexes from 2000 to 2024 reveals an overall growth trend. The S&P BSE Sensex exhibited the highest average annual growth rate, indicating favorable economic conditions, market stability, and investor confidence. Similarly, the S&P 500 and Shanghai Composite Index demonstrated upward trends throughout the analyzed period. Although the Nikkei 225 experienced greater volatility, it still managed to achieve an overall increase. On the other hand, the HSI showed minimal growth at the end of the research period.

Figure 1.1 Time plot of stock market indexes in the selected countries: 2000 to 2024 (Year Start)
(with India)



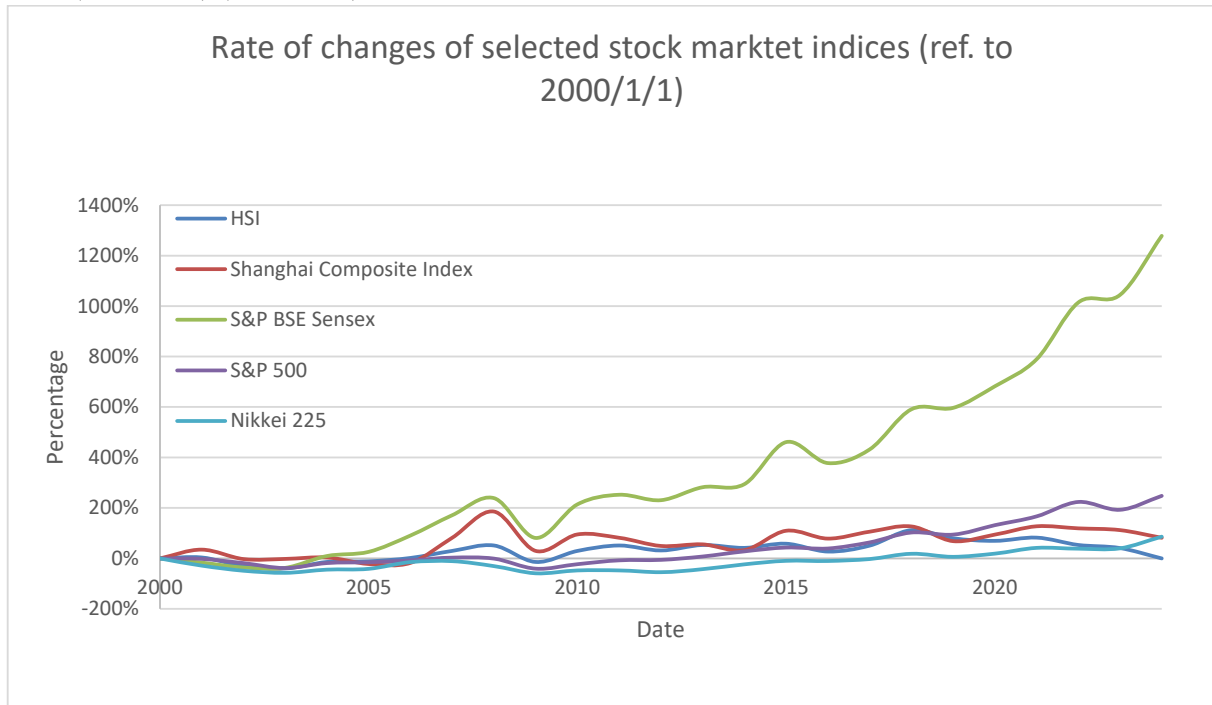
Sources: The dataset listed in Table 1

Figure 1.2 Time plot of stock market indexes in the selected countries: 2000 to 2024 (Year Start)
(w/o India)



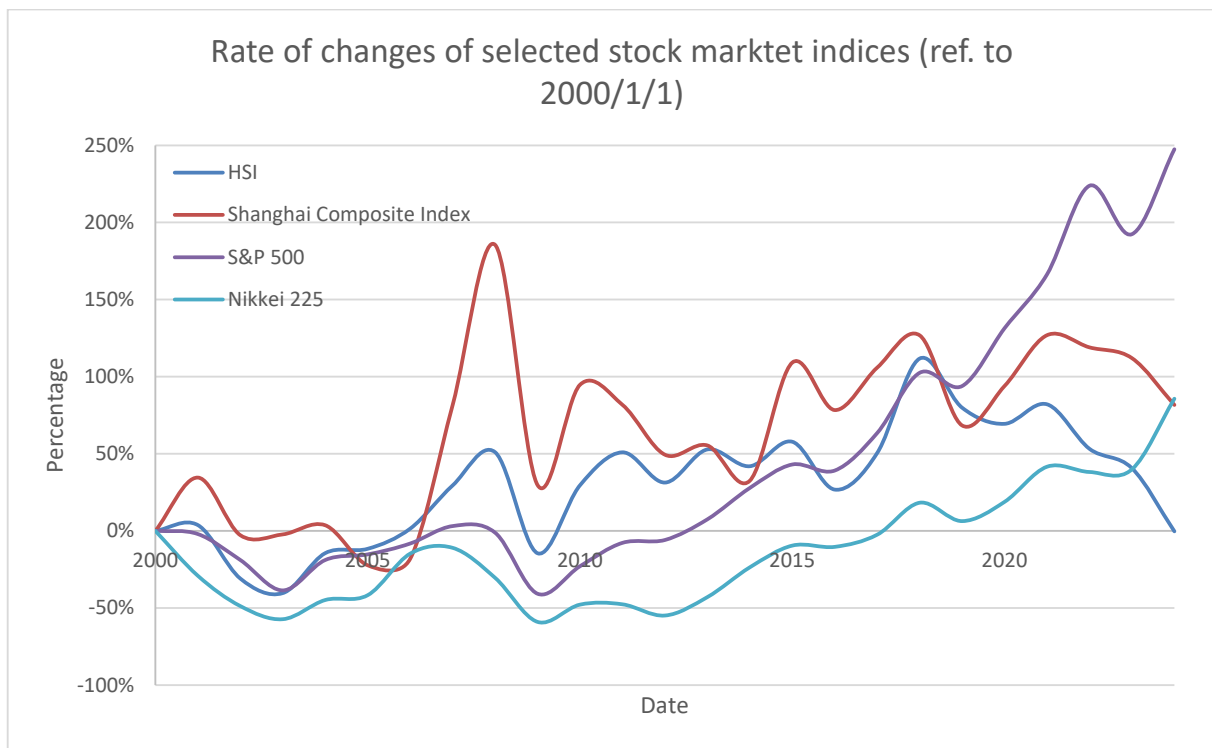
Sources: The dataset listed in Table 1

Figure 2.1 Time plot of rate of changes of stock market indexes in the selected countries: 2000 to 2024 (Year Start) (with India)



Sources: The dataset listed in Table 2

Figure 2.2 Time plot of rate of changes of stock market indexes in the selected countries: 2000 to 2024 (Year Start) (w/o India)



Sources: The dataset listed in Table 2

Table 3 Major summary statistics of rate of changes of stock market indexes in selected countries with reference to 2000/1/1: 2000 to 2024

	<i>HSI</i>	<i>Shanghai Composite Index</i>	<i>S&P BSE Sensex</i>	<i>S&P 500</i>	<i>Nikkei 225</i>
Mean	30.07%	65.01%	362.59%	46.45%	-13.12%
Median	31.28%	78.35%	252.10%	3.14%	-14.79%
Standard Deviation	37.93%	53.58%	367.13%	84.58%	37.50%
Sample Variance	14.38	28.70	1347.87	71.54	14.06
Range	152.12%	207.92%	1316.00%	288.27%	144.80%
Minimum	-40.39%	-22.36%	-37.56%	-40.77%	-59.09%
Maximum	111.73%	185.56%	1278.45%	247.49%	85.71%
<i>Sources: Calculated from the dataset listed in Table 2</i>					

In order to gain further insights from the stock market data, statistical summaries were calculated, as presented in Table 3. Upon analyzing the table, it becomes evident that the S&P BSE Sensex exhibits the highest volatility among the indexes. It maintains an average return of over 350% with a median return of around 250%, indicating a consistently high rate of return throughout the studied period. However, the extreme standard deviation of 367.13% and a range of 1316% highlight the substantial risk associated with this index.

The S&P 500 follows closely behind the S&P BSE Sensex with the second-highest standard deviation and range. The large range difference is primarily driven by significant variations in returns, indicating a high level of risk, but also the potential for higher returns, similar to the Sensex index.

On the other hand, the Shanghai Composite Index and HSI show relatively lower standard deviations and ranges. When combined with the information obtained from Figure 2.2, it can be observed that the Shanghai Composite Index reached its highest point in 2015 but failed to return to that level within the studied period. A similar trend can be observed in the HSI, which reached its peak in 2018 and did not surpass that level during the period under consideration.

Regarding the Nikkei 225, despite having a negative mean of -13.12% due to negative returns experienced from 2000 to 2017, the index's rise from 2017 to 2023 is not reflected in its mean and median. The notable observation for the Nikkei 225 lies in its range of 144.80% and its maximum, 85.71%, indicating a significant difference between its negative mean and median.

In explaining the performance of stock market indexes, several factors such as GDP, inflation rate, and interest rates play significant roles in influencing their values. One important factor to consider is interest rates. Generally, there is an inverse relationship between stock prices and interest rates. When interest rates rise, borrowing becomes more expensive, resulting in higher costs for companies. This can lead to lower profits and, subsequently, reduced stock prices.

Additionally, rising interest rates can make fixed-income investments, such as bonds, more attractive compared to stocks. As a result, investors may shift their investments away from stocks and towards bonds, causing a decrease in the supply of money in the stock market. This decrease in demand for stocks can lead to a decrease in stock prices.

It is important to note that the relationship between interest rates and stock prices is not always straightforward and can be influenced by various other factors. However, the general principle of higher interest rates impacting stock prices negatively is widely observed (Alam & Uddin, 2009).

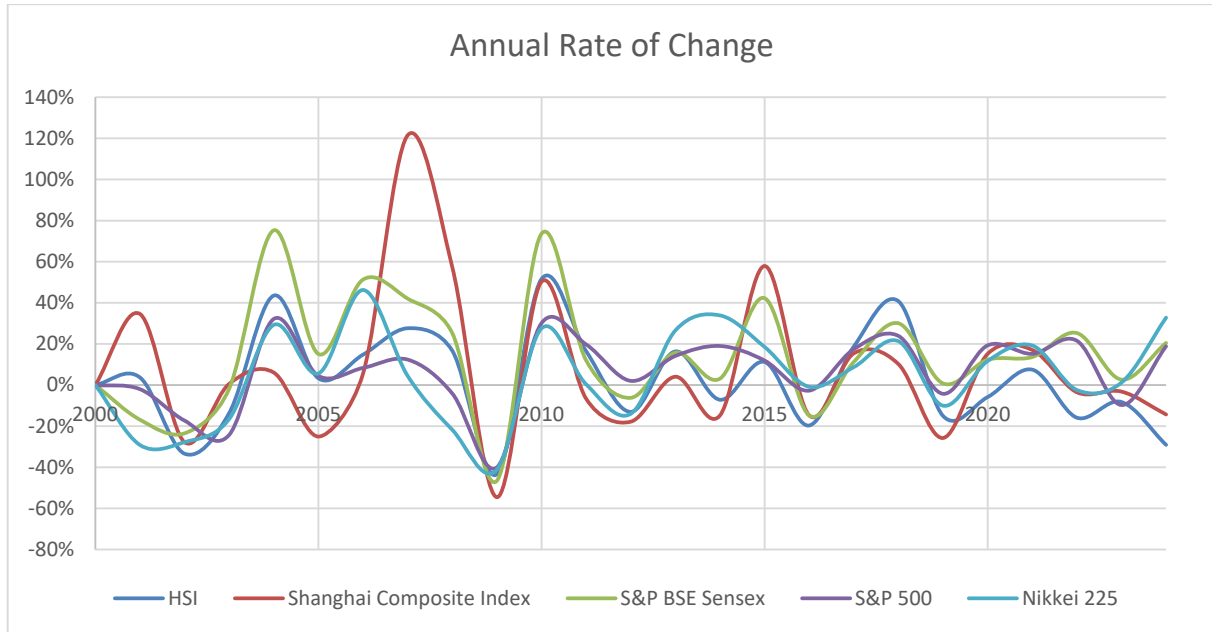
In conclusion, the statistical analysis of the stock market data reveals varying levels of volatility and risk among the different indexes. The S&P BSE Sensex exhibits the highest volatility and risk, followed by the S&P 500. The Shanghai Composite Index and HSI demonstrate relatively lower volatility and risk, while the Nikkei 225 displays a unique pattern with a negative mean but a considerable range difference indicating a shift in its performance over time.

Table 4 Correlation between the rate of changes of stock market indexes in selected countries with reference to 2000/1/1: 2000 to 2024

	<i>HSI</i>	<i>Shanghai Composite Index</i>	<i>S&P BSE Sensex</i>	<i>S&P 500</i>	<i>Nikkei 225</i>
HSI	1				
Shanghai Composite Index	0.736276	1			
S&P BSE Sensex	0.575972	0.615642	1		
S&P 500	0.496912	0.524741	0.965666	1	
Nikkei 225	0.467312	0.514397	0.896789	0.944747	1
<i>Sources: Dataset calculated from the data listed in Table 1</i>					

In table 4, a summary can be drawn that the S&P BSE Sensex, S&P 500, and Nikkei 225 exhibit a strong correlation with each other, while the HSI and Shanghai Composite Index show a relative relationship between the two.

Figure 3 Time plot of the annual rate of change of stock market indexes in the selected countries (%): 2000 to 2024 (Year Start)



Sources: Dataset calculated from the data listed in Table 1

Table 5 Major summary statistics of semi-annual rate of change in AA in selected countries: 2000 to 2024 (Year Start) (%)

	HSI	Shanghai Composite Index	S&P BSE Sensex	S&P 500	Nikkei 225
Mean	2.71%	7.49%	14.50%	6.64%	4.94%
Median	3.25%	0.55%	12.32%	11.92%	4.41%
Standard Deviation	23.81%	35.78%	28.12%	17.21%	22.24%
Sample Variance	5.67%	12.80%	7.91%	2.96%	4.95%
Range	94.93%	176.07%	121.83%	72.28%	87.40%
Minimum	-43.39%	-54.59%	-46.60%	-40.09%	-41.19%
Maximum	51.54%	121.48%	75.23%	32.19%	46.21%

Sources: Dataset calculated from the data listed in Table 1

To gain a deeper understanding of stock market index fluctuations across countries, a time plot was created based on the annual rate of changes derived from the data presented in Table 1. This plot allowed for the examination of annual growth rates, and summary statistics were calculated to assess the level of fluctuation.

Referring to the findings from Figure 3 and Table 4, the majority of selected indexes exhibited standard deviations of annual changes within the range of approximately 17% to 35%. Notably, the

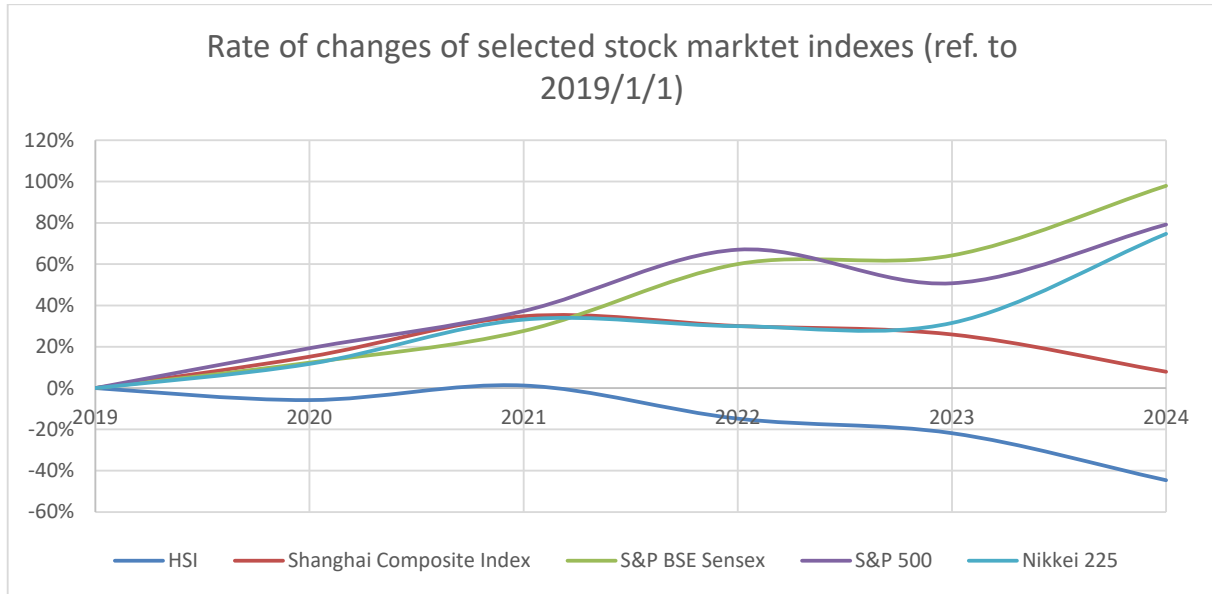
S&P 500 stood out with the lowest average growth rate changes among the indexes, at 17.21%, indicating a relatively stable trend.

Among the indexes examined, the S&P BSE Sensex displayed the highest mean growth rate, nearing 14%. This corresponds with the mean value reported in Table 3, suggesting that this index consistently maintained the highest growth rate and return.

Figure 3 revealed significant fluctuations in the annual rate of change for the Shanghai Composite Index during the period of 2005 to 2007, with a marked increase. Additionally, all indexes experienced a substantial drop and subsequent rebound 2007 to 2009, coinciding with the global financial crisis. The performance of the Shanghai Composite Index during this period can be attributed to various factors, including the listing of large companies, the Bank of China IPO, and equity division reforms, all of which increased tradable shares in listed companies. These factors attracted investments into the Chinese market, resulting in the rise of the index (Reuters, 2008) (Jiang, et al., 2010). As mentioned earlier, the global financial crisis in 2008 had a significant impact on the economies of most countries, as evidenced by the sharp decline in indexes during that year. The subsequent strong recovery, as depicted in Figure 3, occurred around the beginning of 2009.

3.2. Pattern of the local trend movement

Figure 4 Time plot of stock market indexes in the selected countries: 2019 to 2024 (Year Start) (Ref to 2019/1/1)



Sources: Dataset calculated from the data listed in Table 1

Table 6 Major summary statistics of AA in selected countries: 2019 to 2024 (Year Start)

	HSI	Shanghai Composite Index	S&P BSE Sensex	S&P 500	Nikkei 225
Mean	-14.31%	18.97%	43.69%	42.26%	30.18%
Median	-10.32%	20.57%	43.84%	44.06%	30.77%
Standard Deviation	17.27%	13.55%	36.82%	29.62%	25.47%
Sample Variance	2.98%	1.84%	13.55%	8.77%	6.49%
Range	45.80%	34.76%	97.90%	79.20%	74.68%
Minimum	-44.58%	0.00%	0.00%	0.00%	0.00%
Maximum	1.22%	34.76%	97.90%	79.20%	74.68%

Sources: Dataset calculated from the data listed in Table 1

Table 7 Correlation between the rate of changes of stock market indexes in selected countries with reference to 2019 to 2024 (Year Start)

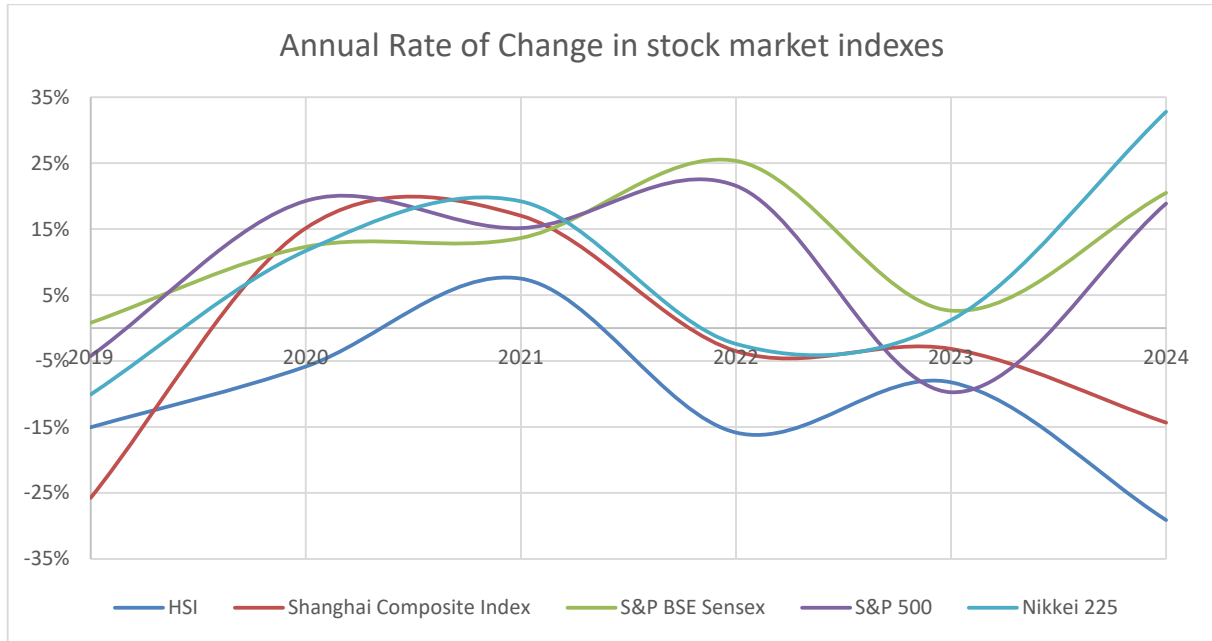
	<i>HSI</i>	<i>Shanghai Composite Index</i>	<i>S&P BSE Sensex</i>	<i>S&P 500</i>	<i>Nikkei 225</i>
HSI	1				
Shanghai Composite Index	0.186891	1			
S&P BSE Sensex	-0.9261	0.168031	1		
S&P 500	-0.80955	0.366767	0.958585	1	
Nikkei 225	-0.86372	0.118451	0.914501	0.884437	1
<i>Sources: Dataset calculated from the data listed in Table 1</i>					

Figure 4 reveals several noteworthy trends. Over the past five years, the S&P BSE Sensex, S&P 500, and Nikkei 225 have shown an upward trajectory, indicating positive performance. On the other hand, the HSI and Shanghai Composite Index have experienced a downward trend. As mentioned earlier, the indexes witnessed a downward movement in 2020 as a result of the COVID-19 pandemic. However, the S&P BSE Sensex, S&P 500, and Nikkei 225 managed to rebound and resume their upward trend in the latter part of 2020, thanks to supportive fiscal policies, economic recovery, and improved earnings (Hannah Miao;Tanaya Macheel, 2021).

In table 7, a summary can be drawn that the S&P BSE Sensex, S&P 500, and Nikkei 225 exhibit a strong correlation with each other, while the HSI shows little to no correlation with the Shanghai Composite Index. Additionally, the HSI demonstrates an opposite trend to the S&P BSE Sensex, S&P 500, and Nikkei 225.

It is worth noting that the HSI and Shanghai Composite Index deviate from the overall trend observed in the other indexes. This discrepancy can be attributed to various factors. In the case of China, the chosen lockdown policies following the COVID-19 pandemic hindered the economic recovery, impacting the performance of the Shanghai Composite Index. Moreover, a debt crisis in the housing estate sector in 2023 affected listed companies associated with housing estates, leading to a decline in investor confidence in the investment market. In the context of Hong Kong, persistent challenges arose due to concerns about the mainland's economic outlook and expectations of prolonged high interest rates, which significantly affected investor sentiment. Consequently, the local stock market in Hong Kong remained under pressure during this period (Hong Kong Economy - The Gov of HKSAR, 2023).

Figure 5 Time plot of the semi-annual rate of change in stock market indexes in the selected countries (%): 2019 to 2024 (Year Start)



Sources: Dataset calculated from the data listed in Table 1

Table 8: Major summary statistics of annual rate of change in stock market indexes in the selected countries: 2019 to 2024 (Year Start)

	HSI	Shanghai Composite Index	S&P BSE Sensex	S&P 500	Nikkei 225
Mean	-11.09%	-2.43%	12.54%	10.15%	8.74%
Median	-11.63%	-3.32%	12.99%	17.01%	6.45%
Standard Deviation	12.20%	16.58%	9.63%	13.54%	15.69%
Sample Variance	1.49	2.75	0.93	1.83	2.46
Range	36.60%	42.77%	24.53%	31.29%	42.85%
Minimum	-29.11%	-25.75%	0.81%	-9.72%	-10.06%
Maximum	7.49%	17.02%	25.34%	21.57%	32.79%

Sources: Dataset calculated from the data listed in Table 1

The annual rate of change over the past five years is depicted in Figure 5, and the corresponding data is presented in Table 6. Additionally, the semi-annual rate of change strengthens the observation of trend movements in the indexes, reflecting the global economic rebound following the COVID-19 pandemic.

In contrast to the trends observed in the time plot, a decrease in the annual rate of change can be seen after a strong rebound starting from 2020. This can be attributed to several factors. Firstly, the Federal Reserve Tapering in the United States had a significant impact (Maggie Fitzgerald, 2021). Additionally, the increase in interest rates that commenced in March 2022 greatly affected investor sentiment and the flow of funds into the stock market (Jeff Cox, 2022). These factors contributed to a global downward trend in 2021 and 2022.

3.3. Summary of findings

This analysis offers a comprehensive overview of major stock market indexes' performance in various countries, connecting it to expected returns and risk factors, thus aiding in identifying countries with the optimal risk-return tradeoff for long-term investment and highlighting potential investment opportunities. The similarities, differences and potential correlations can be summarized as follows:

Similarities: All indexes showed growth over the long term, indicating that despite short-term fluctuations, stock markets tend to grow over time. Additionally, all markets experienced periods of high volatility, reflecting global economic uncertainties and local market dynamics.

Differences: The S&P BSE Sensex and the S&P 500 demonstrated high growth rates but also high risk-return. In contrast, the Shanghai Composite Index and Hang Seng Index showed more stable growth with lower volatility. The Nikkei 225 displayed resilience and growth potential, positioning it between the high growth and high volatility of the Indian and U.S. markets and the stability of the Chinese markets.

Potential Correlations: The performance of the S&P BSE Sensex and the S&P 500 suggests that markets in large, diversified economies can offer high returns with high risks. The correlation between the Shanghai Composite and Hang Seng Index's lower volatility and the recent economic policies and challenges in China indicates that domestic factors significantly impact market

performance. The upward trend of the Nikkei 225 from 2019-2023, despite global challenges, suggests that certain structural factors in the Japanese economy may offer resilience to global economic fluctuations.

The findings indicate that Indian and U.S. markets offer high return potential, they also come with significant risks. On the other hand, the Chinese market, represented by the Shanghai Composite and Hang Seng Index, shows more stable historical growth but has been impacted by recent domestic issues. This analysis aids investors in identifying countries with the optimal risk-return tradeoff for long-term investments, linking stock index performance directly to expected return and risk considerations.

4. Conclusion and recommendations

4.1. Conclusion

This research aimed to identify potential investment opportunities by analyzing trends in major stock market indexes across different countries. The findings revealed that the S&P BSE Sensex and S&P 500 provided the highest returns on average but also carried significant risks. Meanwhile, the Shanghai Composite Index and HSI exhibited more stable growth with relatively lower volatility. More recently from 2019 to 2023, the S&P BSE Sensex, S&P 500 and Nikkei 225 maintained an upward trend while the HSI and Shanghai Composite declined. Therefore, the objectives of examining index trends, comparing performance, and identifying countries with favorable risk-return profiles were achieved. India and the US markets showed the greatest potential for investment but required for close monitoring.

4.2. Recommendations

Based on the conclusions drawn, some strategic recommendations for investment expansion are proposed. Given the high returns demonstrated by the Indian market, expanding investments into key sectors in India such as technology, banking and consumer goods presents opportunities for growth. However, special attention must be paid to volatility risks. Diversifying investments across multiple sectors can help mitigate industry-specific risks. Regular monitoring of economic indicators like GDP growth, inflation and policy changes is also advised to navigate periods of high volatility in the stock market.

While the US market showed strong and consistent performance historically, current uncertainties around inflation and interest rate hikes warrant a cautious approach. A phased expansion focusing initially on large capital companies with strong fundamentals and dividend payouts can help reduce risks. Exposure to the Chinese market provides stability benefits but recent real estate issues are concerning. Investing in sectors less dependent on property and with good overseas revenue streams like healthcare and renewable energy carries less domestic risk.

References

- Alam, M. M. & Uddin, G., 2009. Relationship between Interest Rate and Stock Price: Empirical Evidence from Developed and Developing Countries. *International Journal of Business and Management*, 4(3), pp. 43-51.
- China Securities Index Co. Ltd, 2020. *Methodology of SSE Composite Index*. [Online]
Available at:
http://english.sse.com.cn/indexes/indexes/list/indexmethods/c/000001_000001en_EN.pdf
[Accessed 16 2 2024].
- Claessens, S. & Kose, M. A., 2010. The financial crisis of 2008–2009: Origins, issues, and prospects. *Journal of Asian Economics*, 21(1), pp. 239-241.
- Dave Sebastian, 2024. *The Wall Street Journal - Hong Kong's Hang Seng Index Drops for Fourth Straight Year*. [Online]
Available at:
<https://www.wsj.com/livecoverage/stock-market-today-dow-jones-12-29-2023/card/hong-kong-s-hang-seng-index-drops-for-fourth-straight-year-zP8TvZpENr8QLEqdh6YA>
[Accessed 16 2 2024].
- Financial Times, 2023. *Over 75% of foreign money invested into Chinese stocks in 2023 has left*. [Online]
Available at: <https://www.ft.com/content/20c5d5c8-dd64-4c22-a3fc-60d4a8336aeb>
[Accessed 16 2 2024].
- Graeme Wearden, 2020. *The Guardian - 'I've never seen anything like it': 2020 smashes records in global markets*. [Online]
Available at:
<https://www.theguardian.com/business/2020/dec/30/ive-never-seen-anything-like-it-2020-smashes-records-in-global-markets>
[Accessed 21 2 2024].
- Hang Send Indexes, 2024. *Hang Send Index Factsheets*. [Online]
Available at: https://www.hsi.com.hk/static/uploads/contents/en/dl_centre/factsheets/hsie.pdf
[Accessed 15 2 2024].
- Hang Send Indexes, n.d. *Hang Seng Index*. [Online]
Available at: <https://www.hsi.com.hk/eng/indexes/all-indexes/hsi>
[Accessed 15 2 2024].
- Hannah Miao;Tanaya Macheel, 2021. *S&P 500 ends 2021 with a nearly 27% gain, but dips in final trading day*. [Online]
Available at: <https://www.cnbc.com/2021/12/30/stock-market-futures-open-to-close-news.html>
[Accessed 20 2 2024].
- Hong Kong Economy - The Gov of HKSAR, 2023. *Press Release and Economic Forecasts*. [Online]
Available at: https://www.hkeconomy.gov.hk/en/pdf/23q3_pr.pdf
[Accessed 23 2 2024].
- Hong Kong Monetary Authority, 2023. *Press release - Exchange Fund Position at end-December*

2022. [Online]
Available at:
<https://www.hkma.gov.hk/eng/news-and-media/press-releases/2023/01/20230130-3/>
[Accessed 13 2 2024].
- Jeff Cox, 2022. *CNBC - Federal Reserve approves first interest rate hike in more than three years, sees six more ahead.* [Online]
Available at: <https://www.cnbc.com/2022/03/16/federal-reserve-meeting.html>
[Accessed 23 2 2024].
- Jiang, Z.-Q.et al., 2010. Bubble diagnosis and prediction of the 2005–2007 and 2008–2009. *Journal of Economic Behavior & Organization*, Volume 74, pp. 149-162.
- Maggie Fitzgerald, 2021. *CNBC - S&P 500 falls Friday, notches second straight week of losses in September slump.* [Online]
Available at: <https://www.cnbc.com/2021/09/16/stock-market-futures-open-to-close-news.html>
[Accessed 23 2 2024].
- Nikkei Indexes -Nikkei 225 Official Site-, 2024. *Nikkei Stock Average (Nikkei 225).* [Online]
Available at: <https://indexes.nikkei.co.jp/en/nkave/index/profile?idx=nk225>
[Accessed 15 2 2024].
- Ofek, E. & Richardson, M., 2003. DotCom Mania: The Rise and Fall of Internet Stock Prices. *The Journal of Finance*, 58(3), pp. 1-7.
- Rashmi Gupta, 2024. *J.P.Morgan - Why now may be a good time to consider Indian equities.* [Online]
Available at:
<https://privatebank.jpmorgan.com/apac/en/insights/markets-and-investing/ideas-and-insights/enter-the-tiger-why-now-may-be-a-good-time-to-consider-Indias-equities>
[Accessed 20 2 2024].
- Reuters, 2008. *REUTERS - The rise and fall of China's stock market.* [Online]
Available at: <https://www.reuters.com/article/idUSSHA74197/>
[Accessed 23 2 2024].
- S
- &P Dow Jones Indexes, 2024. *S&P 500, S&P Dow Jones Indexes.* [Online]
Available at: <https://www.spglobal.com/spdji/en/indexes/equity/sp-500/#overview>
[Accessed 16 21 2024].
- S&P Dow Jones Indexes, 2024. *S&P BSE SENSEX, S&P Dow Jones Indexes.* [Online]
Available at: <https://www.spglobal.com/spdji/en/indexes/equity/sp-bse-sensex/#overview>
[Accessed 16 2 2024].
- SCMP, 2023. *Hong Kong economy shrinks 'worse-than-expected 3.5 per cent' in 2022, but experts predict 3 per cent growth this year under return to normal.* [Online]
Available at:
<https://www.scmp.com/news/hong-kong/hong-kong-economy/article/3208712/hong-kong-economy-shrinks-worse-expected-35-cent-2022-weak-external-demand-advance-figures-show>
[Accessed 12 2 2024].

Shilling, H., 1996. *The International Guide to Securities Market Indexes*. 1 ed. s.l.:Taylor & Francis.

The Wall Street Journal, 2023. *Stock Market News, Dec. 29, 2023: S&P 500 Closes Out a Big Year Short of a New Record*. [Online]

Available at:

<https://www.wsj.com/livecoverage/stock-market-today-dow-jones-12-29-2023/card/hong-kong-s-hang-seng-index-drops-for-fourth-straight-year-zP8TvZpENr8QLEqdh6YA>

[Accessed 13 2 2024].

Tretina, K., 2022. *Forbes Advisor - What is Market Index*. [Online]

Available at: <https://www.forbes.com/advisor/investing/stock-market-index/>

[Accessed 15 2 2024].

Tretina, K., 2023. *What Is The S&P 500? How Does It Work?*, *Forbes Advisor*. [Online]

Available at: <https://www.forbes.com/advisor/investing/what-is-sp-500/>

[Accessed 16 2 2024].

Weihseng Chen; Yuxuan Tan; Cameron Chui, 2023. *J.P.Morgan - Can Japan continue rallying?*.

[Online]

Available at:

<https://privatebank.jpmorgan.com/apac/en/insights/markets-and-investing/can-japan-continue-rallying>

[Accessed 20 2 2024].

Yahoo Finance, 2024. *HANG SENG INDEX Historical Data*. [Online]

Available at: <https://finance.yahoo.com/quote/%5EHSI/>

[Accessed 16 2 2024].

Yahoo Finance, 2024. *Nikkei 225 Historical Data*. [Online]

Available at: <https://finance.yahoo.com/quote/%5EN225/history>

[Accessed 16 2 2024].

Yahoo Finance, 2024. *S&P 500 Historical Data*. [Online]

Available at: <https://finance.yahoo.com/quote/%5EGSPC/history>

[Accessed 16 2 2024].

Yahoo Finance, 2024. *S&P BSE SENSEX Historical Data*. [Online] Available at:

<https://finance.yahoo.com/quote/%5EBSESN/history/>

[Accessed 16 2 2024].

Yahoo Finance, 2024. *SSE Composite Index Historical Data*. [Online]

Available at: <https://finance.yahoo.com/quote/000001.SS/history>

[Accessed 16 2 2024].