

## Dollar-Cost Averaging versus Lump Sum – What is the Best Investment Strategy for Chinese Stock Markets?

Parichat Jantori, Polkit Meepien

Integrated Bachelor's and Master's Degree Program, Thammasat Business School,

Thammasat University, Thailand

2 Prachan Rd., Pranakorn, Bangkok, Thailand, 10200

E-Mail: parichat@tbs.tu.ac.th

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### Abstract

Today, investment is no longer confined to domestic markets, as an increasing number of investors are turning to international markets to diversify risk and enhance return potential. China as the second-largest economy globally, is considered attractive by many investors for several strategic and economic reasons. This study analyzes two widely used investment strategies—Dollar-Cost Averaging (DCA) and Lump Sum (LS)—applied to the Shanghai Shenzhen CSI 300 Index and the Hang Seng China 50 Index. The objective is to determine which strategy generates higher returns, minimizes the duration of continuous losses, and outperforms risk-free investments, such as 1-year Thai government bonds. Data from 2006 to 2023 was collected on the indices and bond returns. Finding reveals that within the parameters of this research, only the Lump Sum strategy in the Shanghai Shenzhen CSI 300 Index produced higher returns compared to risk-free assets and had the shortest continuous loss period of 4 months.

**Keywords:** Dollar-Cost Averaging, Lump Sum, Investment Strategy, Chinese Stock Market

### Introduction

Globalization has created a wide range of new investment opportunities beyond national borders. Today, investment is no longer confined to domestic markets, as an increasing number of investors are turning to international markets to diversify risk and enhance return potential. Recent trends indicate that Thai investors are increasingly shifting their focus toward Chinese and other international stock markets. This growing interest is

driven by several factors, including rising political and economic uncertainties within Thailand, limited diversification opportunities in the domestic market, and growing familiarity with prominent global companies. Thai investors majorly invest in fixed-term bond fund, amounting to approximately 152.4 billion Baht, followed by investment in Vietnamese asset, 21.9 billion Baht and Chinese assets with approximately 21.4 billion Baht (The Thai Bond Market Association, 2023). Additional information revealed that the age of Thai investors varies from 21 to 50 years old, indicating that most investors are in early working age to pre-retirement age. Key motives for investment in overseas asset include regular saving plan that enables long-term wealth accumulation, diversification of portfolios and opportunity to gain higher yield compared to others investment options.

In addition to market selection, investment strategy and portfolio management play a critical role in optimizing investor returns. Two dominant strategies for long-term investments, namely Dollar-Cost Averaging (DCA) and Lump Sum (LS) are widely employed in among investors and also in Thailand (Brennan et al., 2005; Kanin Anantanasuwong, & Sirithida Chaivisuttangkun, 2018; Tharitsaya Kongkaew, & Chirawat Saengpao, 2024).

The Dollar-Cost Averaging (DCA) is generally referred to when an investor puts regularly a constant fraction of her wealth into the same asset to outperform the return that she would get by putting all her capital in an asset at once (Smith & Artigue, 2018; Kirby et al., 2020). The Lump Sum (LS) strategy refers to when investing a large amount of capital into a financial market or asset all at once, rather than spreading the investment over time. (Gajera et al., 2020; Lu et al., 2021).

Some previous studies suggested that DCA might offer higher returns (Brennan et al., 2005; Trainor, 2005; Lu et al., 2021). But the review of literatures showed controversial results (Gajera et al., 2020; Eriksson & Fransson, 2021; Isynwardhana & Aslam, 2023).

As investors are seeking to maximize returns, understanding which strategies—DCA or LS—are most effective in these markets becomes crucial. Accordingly, this study seeks to evaluate and compare the performance outcomes of DCA and LS investment strategies in the Shanghai Shenzhen CSI 300 and Hang Seng China 50 indices, as well as to benchmark these results against investments in a risk-free asset, specifically Thai government bonds.

## Research Objectives

The objectives of this study include

1. To assess the effectiveness of two investment strategies—Dollar-Cost Averaging (DCA) and Lump Sum (LS)—when applied to the Shanghai Shenzhen CSI 300 and Hang Seng China 50 indices
2. To compare the investment outcomes from both investment strategies with a risk-free benchmark, such as the Thai government bonds, to evaluate opportunity costs

## Literature Review

### Dollar-Cost Averaging (DCA) Strategy versus Lump Sum (LS) Investment Strategy

The Dollar-Cost Averaging (DCA) is defined as a strategy, in which an investor regularly invests a fixed amount over set intervals, like monthly or quarterly, instead of investing at once (Smith & Artigue, 2018; Kirby et al., 2020). Wei (2007) added that DCA is an investment strategy that yields good long-term results, since the assets may experience price volatility, making it challenging for average investors to perfectly identify the market timing or time to invest. Thus, DCA eliminates the difficulty of market timing. This result aligned with other previous studies, which revealed that the DCA outperforms the Lump Sum investment strategy for all except the most risk tolerant investors (Brennan et al., 2005). Trainor (2005) added that DCA continues to be recommended, when considering risk throughout the investment horizon. The more recent study from Lu et al. (2021) also concluded that DCA is a better trading strategy compared to Lump Sum (LS) for investment, even in the uptrend market and especially on high risky assets.

Nevertheless, some studies came up with controversial results. Kanin Anantanasuwong, & Sirithida Chaivisuttangkun (2019) conducted the study in 2018, employing DCA in Thai Stock Market in order to examine the effectiveness of DCA both in terms of mean-variance efficiency and downside risk in comparison to LS strategy. It concluded that DCA led to a less value of terminal wealth, failed to prevent the investor's wealth from a huge loss during the 2008 financial crisis.

The Lump Sum (LS) strategy involves making a large investment in one go (Gajera, et al., 2020; Lu et al., 2021). Gajera, et al. (2020) also suggested investors to go for LS investment rather than other approaches, if investors have to weigh between return and risk. Eriksson & Fransson (2021) conducted a study in the context of Swedish equity market and found out that LS strategy is a superior investment strategy, since it generated a higher HPR, Sharpe ratio, Sortino ratio, and Value function. In Thai context, Anan Kritsadrangporn (2016) conducted a

study comparing the DCA and LS strategy in Long Term Investment Fund or LTF and concluded that neither DCA nor LS strategy generate more return than each other but it depended on the trend of stock market. But LS strategy is rather suited to those experienced investors, who can accurately anticipate market directions. Patchara Nimitpornasukho (2013) revealed that LS can yield high returns, if the market's direction is correctly predicted. Also, in Indonesia stock market, LS strategy seemed to draw better return than DCA strategy (Isyнуwardhana & Aslam, 2023).

### **The Shanghai Shenzhen CSI 300 Index and Hang Seng China 50 Index**

The Shanghai Shenzhen CSI 300 Index comprises of the top 300 largest companies listed on Chinese stock exchanges. These include well-known firms such as Kweichow Moutai, Ping-An Insurance, Contemporary Amperex Technology, China Merchants Bank, and Industrial and Commercial Bank of China (Bloomberg, 2024). The index effectively reflects the growth or decline of the Chinese economy, as it encompasses a broad range of large corporations across different sectors, including finance, technology, consumer goods, energy, and manufacturing. The Shanghai Shenzhen CSI 300 index offers a broad proxy for the overall Chinese economy.

In contrast, the Hang Seng China 50 Index comprises the 50 largest Chinese companies listed on the Hong Kong Stock Exchange, including notable names such as Tencent Holdings, HSBC Holdings, BYD, Xiaomi, and PetroChina. This index measures the overall performance of the 50 largest China companies listed on Hong Kong and / or mainland China stock exchanges (Hang Seng Index, 2024).

Major difference between the Shanghai Shenzhen CSI 300 Index and the Hang Seng China 50 Index, as identified by some researcher, lies in the distribution of business sectors. Although both indices primarily consist of Chinese companies, the Hang Seng China 50 Index is more heavily weighted towards modern industries, with the top three sectors such as finance, technology and communication, and consumer discretionary (luxury goods). While the top three sectors within the Shanghai Shenzhen CSI 300 Index include finance, industrials, and consumer staples. Hence, by analyzing the investments in these two indices, which are major benchmarks for investing in China and the Hong Kong Special Administrative Region, this will yield a more comprehensive understanding of investment opportunities in these regions.

## Risk-Free Asset

A risk-free asset is an investment that provides a certain return with no variability and is free from default risk over a specified holding period (Bodie et al., 2020). The most prevalent example of a risk-free asset is a government bond, which is deemed risk-free due to its backing by the full faith and credit of a government and resulting in low probability of default. The notion of a risk-free asset is fundamental to financial models and calculations, particularly in the context of frameworks such as the Capital Asset Pricing Model (CAPM). It serves as a critical benchmark for evaluating riskier investments and comparing the performance of various assets. By comparing the return on an investment to the risk-free rate, investors can assess whether the anticipated return adequately compensates for the associated risk (Bodie et al., 2020; Elton et al., 2014).

## Hypothesis

Given the conflicting findings in the existing literature regarding the effectiveness of different investment strategies, a research gap has emerged—highlighting the need for further empirical investigation, particularly when investing the Shanghai Shenzhen CSI 300 Index and Hang Seng China 50 Index. It is hypothesized that there exists a difference in investment performance between the Dollar-Cost Averaging (DCA) strategy and the Lump Sum (LS) strategy when applied to the Chinese stock market and a risk-free asset, over an equivalent investment horizon.

## The conceptual framework

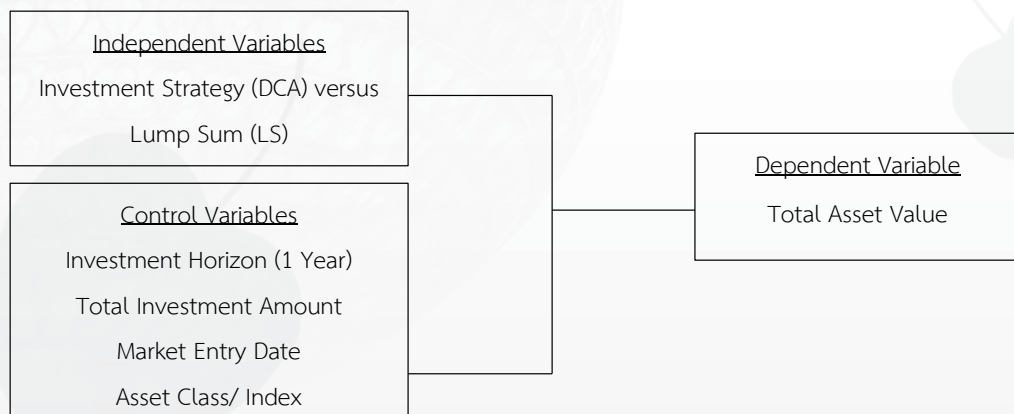


Figure 1 Conceptual Framework

## Methodology

A comparative analysis was undertaken to assess the effectiveness of two investment strategies—Dollar-Cost Averaging (DCA) and Lump Sum (LS)—when applied to the Shanghai Shenzhen CSI 300 and Hang Seng China 50 indices, as well as to compare their performance against a risk-free asset, namely Thai government bonds.

The dataset comprised historical index data from the Shanghai Shenzhen CSI 300 and Hang Seng China 50 indices, covering the period from January 1, 2006, to December 31, 2023. Monthly opening and closing prices were sourced from Investing.com, a widely recognized global financial data platform. Data on one-year Thai government bond yields was obtained from The Thai Bond Market Association (thaibma.or.th), an authoritative source for Thailand's bond market information.

The study was conducted as follows. For the DCA strategy, it was assumed that the investor allocated THB 10,000 per month—representing a portion of monthly income—for investment at the end of each month. For the LS strategy, it was assumed that the investor invested THB 120,000 at the beginning of the year, corresponding to an annual bonus. In both cases, the total annual investment amounted to THB 120,000. For the Thai government bonds, it was assumed that interest payments were reinvested in accordance with the respective investment strategy. At end of the study period on 31 December 2023, the total asset values under each strategy were compared to determine which approach yielded the highest return. The transaction fees or other associated costs were assumed way, as well as there were no minimum investment restrictions.

The calculations of total asset values for each investment strategy were performed as follows:

### **The Calculation of Asset Value for Dollar-Cost Averaging (DCA) in the Shanghai Shenzhen CSI 300 and Hang Seng China 50 Index**

The asset value resulting from a DCA strategy was calculated by first determining the quantity of investment units acquired in each period. This was achieved by dividing the amount of money invested in each DCA transaction by closing price in that period. The total number of units accumulated over the investment horizon was then computed as the sum of all periodic unit purchases, i.e. adding up all the units purchased over the entire investment horizon. And the terminal asset value at the end of investment horizon was calculated by multiplying the cumulative number of units by the final market price, or in this

case, the closing price of the Shanghai Shenzhen CSI 300 and Hang Seng China 50 Index on the last day of each month, as this could imply the performance of the DCA strategy at each period.

### ***The Calculation of Asset Value for Lump Sum (LS) Strategy in the Shanghai Shenzhen CSI 300 and Hang Seng China 50 Index***

The asset value from a LS strategy resulted from investing the entire predetermined capital amount at the outset of the investment horizon. Thus, the total quantity of investment units purchased was calculated by dividing the initial capital allocation by closing price on the last day of each month.

This fixed quantity of units was held for the duration of the investment period. The terminal asset value was obtained by multiplying quantity of investment units purchased by the asset's market price at the end of the investment horizon or in this case, the closing price of the Shanghai Shenzhen CSI 300 or Hang Seng China 50 index on the last day of each month.

### ***The Calculation of Total Asset Value for Investments in Thai Government Bonds by using the Dollar-Cost Averaging (DCA) and Lump Sum (LS) strategies.***

For DCA strategy, the monthly investment returns from one-year Thai government bonds, including quarterly interest payments were calculated. The data of one-year Thai government bonds from January 1, 2006, to December 31, 2023 was collected from The Thai Bond Market Association (thaibma.or.th).

Under the DCA strategy, a predetermined fixed investment was deployed at the end of each month toward the acquisition of Thai Government Bonds. The quantity of bond units purchased in each period was calculated by dividing the fixed monthly allocation by the prevailing market price of the bond, or, in the case of par-issued bonds, by the adjusted purchase price incorporating accrued interest. The interest were assumed to be reinvested in additional bond units consistent with the established DCA schedule. The terminal Total Asset Value (TAV) was calculated as the sum of the market value of all bond units accumulated over the investment horizon.

Under the Lump Sum strategy, the total annual investment amount was deployed at the beginning of the investment horizon to purchase Thai Government Bonds in a single transaction. The number of bond units purchased is determined by dividing the Lump Sum investment by the prevailing bond price. The interest received was assumed to be reinvested immediately. The Total Asset Value at the end of the investment horizon was calculated as the sum of the market value of all bond units held (total units  $\times$  terminal market price per

unit) and any accrued but unpaid interest.

## Results

This study evaluated the performance of two distinct investment strategies—Dollar-Cost Averaging (DCA) and Lump Sum (LS)—based on the hypothesis that there exists a significant difference in investment outcomes, measured by the total asset value at the end of the investment horizon. The analysis was structured around a scenario representing a Thai investor of working age, who may commit a portion of their salary in amount of THB 10,000 monthly to invest in Chinese Stock Markets or one-year Thai government bond by using the DCA method. Alternatively, this Thai investor may opt for a LS investment strategy by allocating an annual bonus of THB 120,000 to invest at the outset of the year. The investment period started from January 1, 2006, to December 31, 2023. The overall results were illustrated in Table 1.

**Table 1** The performance comparisons between the Dollar-Cost Averaging (DCA) and Lump Sum (LS) in each asset

| Asset and Strategy              | Return<br>(THB) | Return<br>(%) | Continuous<br>Loss Period<br>(Months) | Ability to<br>Outperform<br>Risk-free Assets |
|---------------------------------|-----------------|---------------|---------------------------------------|----------------------------------------------|
| Shanghai Shenzhen CSI 300 (DCA) | 317,449.60      | 14.70         | 15                                    | No                                           |
| Shanghai Shenzhen CSI 300 (LS)  | 497,604.15      | 23.04         | 4                                     | Yes                                          |
| Hang Seng China 50 (DCA)        | -<br>487,074.35 | -22.55        | 22                                    | No                                           |
| Hang Seng China 50 (LS)         | -<br>476,486.92 | -22.06        | 22                                    | No                                           |
| Thai Government Bonds (DCA)     | 350,641.62      | 16.23         | 0                                     | -                                            |
| Thai Government Bonds (LS)      | 368,705.52      | 17.07         | 0                                     | -                                            |

### Shanghai Shenzhen CSI 300 Index

By utilizing the DCA strategy on the Shanghai Shenzhen CSI 300 Index, the total asset value as of December 31, 2023, reached THB 2,477,449.60. The cumulative investment capital over the entire period amounted to THB 2,160,000.00, resulting in a net profit of THB 317,449.60, which corresponds to a return of 14.70%. The analysis further revealed that

investors employing the DCA strategy experienced periods where the asset value fell below the total invested capital for 29 months out of a total of 216 months. The longest consecutive loss period spanned 15 months.



Figure 2 The Asset Value and the Invested Capital using the Dollar-Cost Averaging in the Shanghai Shenzhen CSI 300 Index from January 1, 2006, to December 31, 2023.

In contrast, the LS investment strategy yielded a total asset value of THB 2,657,604.15 by the end of the investment period on December 31, 2023. This strategy generated a profit of THB 497,604.15, reflecting a return of 23.04%. Moreover, the loss periods associated with the LS strategy were notably shorter, totaling 5 months, with the longest period of loss lasting only 4 months. Consequently, the LS strategy outperformed the DCA approach with respect to the Shanghai Shenzhen CSI 300 Index, delivering higher returns and fewer, shorter loss periods as shown in Figure 3.



Figure 3 The Asset Value and the Invested Capital using Lump Sum strategy in the Shanghai Shenzhen CSI 300 Index from January 1, 2006, to December 31, 2023

### Hang Seng China 50 index

When applying the DCA strategy to the Hang Seng China 50 Index, the total asset value at the end of the investment period on December 31, 2023, was THB 1,672,925.65, reflecting a loss of THB 487,074.35, or -22.55%. Investors using the DCA strategy faced loss periods totaling 44 months, with the longest continuous loss lasting 22 months. In contrast, the Lump Sum strategy yielded a total asset value of THB 1,683,513.08, resulting in a loss of THB 476,486.92, or -22.06%. The LS approach experienced loss periods spanning 36 months, with the longest continuous loss period also lasting 22 months. Both strategies resulted in substantial losses, however, the LS approach exhibited slightly better performance in terms of overall returns and a shorter duration of loss periods as shown in Figure 4 and 5.



Figure 4 The Invested Capital using the Dollar-Cost Averaging in Hang Seng China 50 Index from January 1, 2006, to December 31, 2023.



Figure 5 The asset value and the invested capital using Lump Sum strategy in Hang Seng China 50 Index from January 1, 2006, to December 31, 2023

### Risk-free asset (One-Year Thai government Bonds)

By applying the DCA strategy to 1-year Thai government bonds, the asset value as of December 31, 2023, reached THB 2,510,641.62 from a total investment of THB 2,160,000.00. This resulted in a profit of THB 350,641.62, or 16.23%. The analysis also indicated that investors using the DCA strategy for risk-free assets, specifically 1-year government bonds, did not experience any losses throughout the period. This is attributed to the nature of the risk-free investment, as the bonds were held until maturity, eliminating the potential for losses from premature liquidation. A similar outcome was observed with the LS strategy. Investors yielded a total profit of THB 368,705.52, or 17.07%, from the same total investment of THB 2,160,000.00.

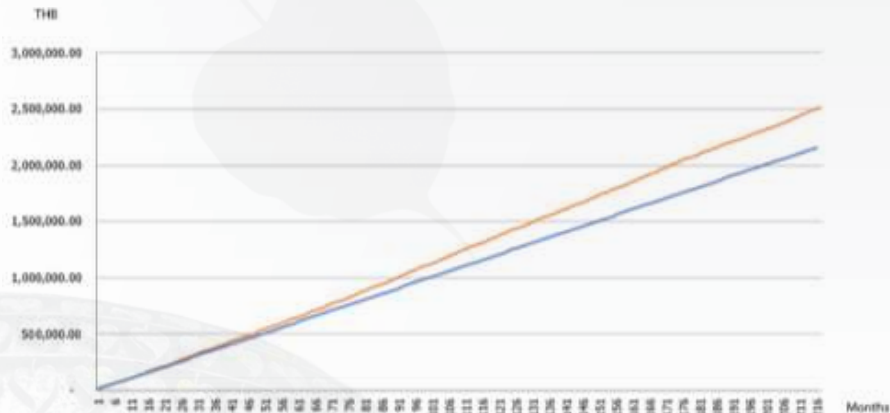


Figure 6 The asset value and the invested capital using the Dollar-Cost Averaging in one-year Thai government bonds from January 1, 2006, to December 31, 2023.

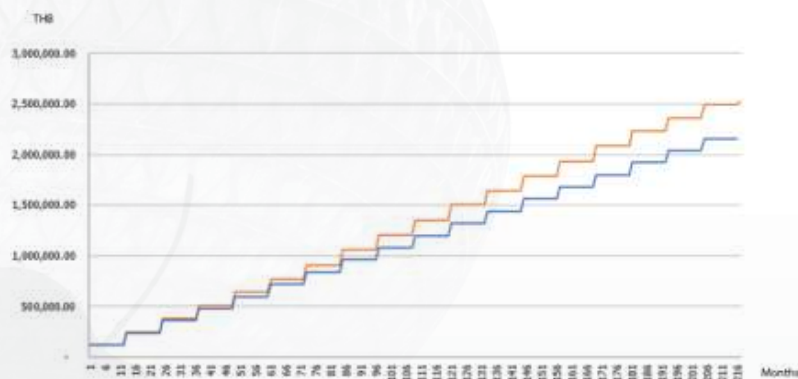


Figure 7 The asset value and the invested capital Lump Sum strategy in one-year Thai government bonds from January 1, 2006, to December 31, 2023.

## Conclusion

The study illustrated that the Lump Sum strategy applied to the Shanghai Shenzhen CSI 300 was the only case that outperformed the conservative risk-free investments, namely the one-year Thai government bonds during the investment horizon. This indicated that investments in riskier assets, such as the Shanghai Shenzhen CSI 300 and Hang Seng China 50 Index, occasionally yielded inferior return compared to those risk-free investments, even though the Dollar-cost Averaging was employed to diversify risk.

## Discussion

According to comparative analysis, it was noted that both DCA and LS investment strategies applied to Thai government bonds, designated as risk-free asset, could yield superior return compared to the DCA strategy on the Shanghai Shenzhen CSI 300 Index and the Hang Seng China 50 Index. This could be implied that investing in riskier assets may not bring higher return. The returns could still fall short of those from risk-free assets.

Moreover, the Lump Sum strategy applied to the Shanghai Shenzhen CSI 300 was the only case that surpassed the risk-free return. This could be attributable to the premise that, in markets with upward potential, Lump Sum investments tend to generate superior returns, assuming the investor is capable of withstanding short-term losses.

This implication was aligned with some previous research from Patchara Nimitpornasukho (2013), Gajera et al. (2020) and Eriksson and Fransson (2021), who suggested investors to go for LS strategy, as it generated higher return. Additionally, timing may play important role, as LS investment strategies tended to perform better strong or rising market conditions and it requires a relatively high level of risk tolerance (low risk aversion) (Grable & Chatterjee, 2015; Leggio & Lien, 2003). Nevertheless, the exclusion of dividend payments in this study may have led to an underestimation of the full potential returns from the LS strategy, particularly in equity indices such as the Shanghai Shenzhen CSI 300.

## Recommendation

Based on the empirical findings, the Lump Sum or LS strategy applied to the Shanghai Shenzhen CSI 300 Index yielded the highest potential returns among the strategies examined. It also outperformed the risk-free yield represented by Thai government bonds. This suggests that investors with exposure to the Chinese and Hong Kong equity markets could, under

favorable market conditions, enhance portfolio performance through Lump Sum investment strategy, i.e. immediate full-capital deployment. However, the LS approach entails an elevated risk of prolonged drawdown periods, which may adversely influence investor behavior, particularly for those who are loss aversion, thereby potentially diminishing realized returns. While the LS strategy demonstrated superior performance in this context, Dollar-Cost Averaging or DCA remains a prevalent approach among investors, primarily due to its capacity to mitigate short-term volatility and behavioral biases, especially in risk-averse cohorts.

### Recommendation for future research

The study acknowledges some limitations. Firstly, it assumed that investments were initiated on the first trading day of each year, neglecting the possibility that varying entry points within the same year or month could lead to divergent outcomes due to price fluctuations. Furthermore, the analysis excluded dividends and overlooked potential investment costs, such as mutual fund management fees or ETF transaction costs. The incorporation of these elements could significantly alter the performance outcomes.

Thus, for future research, it is recommended to account for these omitted factors, such as fees, costs, and dividends, in order to offer a more accurate depiction of potential returns. Additionally, extending the period under study may provide a more comprehensive assessment of the long-term performance of these investment strategies. This more rigorous approach will contribute to a deeper understanding of the trade-offs involved in different investment strategies, particularly in volatile markets like those of China and Hong Kong.

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