

Snowball effect strategy for the innovation of the Korean national pension system

Hyun-Tak Kim^{a,b}

^aDepartment of physics, College of William & Mary, Williamsburg, VA 23185, USA

^bKim Hyun-Tak Physics and Applications Lab¹, Small Hall 154, College of William & Mary, Williamsburg, VA 23185, USA

Corresponding e-mail: htkim580711@gmail.com

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Abstract

In the Korean National Assembly, people are passionately debating innovative strategies to reform the nation's defined benefit retirement pension system in light of the national pension fund's anticipated depletion by 2055. Current proposals, such as raising pension contribution rates and income replacement rates, appear to be mere stopgap measures. We advocate for leveraging the fund through the snowball effect as a strategic solution to these challenges. This leverage could be achieved through exchange-traded funds with high return rates, although they come with high volatility. Additionally, the Korean people must adopt a defined contribution retirement pension system, similar to the 401(k) in the USA.

Key words: Korean pension system, Snowball effect, Exchange-traded fund, 401(k), DC pension system

1. Introduction

Despite Korea's impressive and rapid economic growth, the nation has yet to establish a stable and developed pension system. The country, having adopted the defined benefit (DB) retirement pension system, now faces the dual challenges of a declining birth rate and an increasing elderly population. This demographic shift impedes the future growth of the national pension fund, as an aging society swiftly depletes the accumulated resources, placing a significant burden on future generations. Additionally, the lack of transparency and competence in fund management has deepened public distrust. These issues present profound national challenges that threaten Korea's future advancement. Finding a solution to these critical issues is imperative.

In contrast, the USA adopted the defined contribution (DC) retirement pension system, originated in Sweden and known as the 401(k), in 1981. This system has since become a staple of American retirement planning. The DC pension system, which does not depend on either a decreasing birth rate or an increasing elderly population, has significantly contributed to the growth of the nation's industry. In the DC system, individuals must select a personal pension portfolio, self-pension plan, or investment products supplied by asset management companies – a hallmark of the democratic system. Personal stocks then become valuable income sources for pensions, though they are classified as risky assets.

In this letter, we affirm the applicability of ETFs to the pension system by analyzing prominent ETFs with high return rates or high gains obtained through the snowball effect and investigating their volatility during the burst of the Corona bubble. ETFs, which are collections of stocks, offer a safer long-term option and are less volatile due to their diversification compared to individual stocks with high volatility over a long period.

2. Volatility analysis of 10 years ETF data and pension strategy

The long-term ETF return rate, which can be regarded as gain, has undergone economic cycles with a negative return rate two or three times in five years, as shown by the red arrows in Fig. 1. To ensure the safety of ETFs, we determine the gains of the pension return rates for VOO, which includes 500 companies and has a 10-year average return rate of approximately 270%; QQQ (Nasdaq 100), which includes 100 companies and has a 10-year average return rate of approximately 500%; and SMH (VanEck Semiconductor), which includes 25 companies and has a 10-year average return rate of approximately 1000%, as shown in Fig. 1. The high gains

¹ <https://sites.google.com/view/hyun-tak-kim/>

are caused by the snowball effect. Note that the return rate is different from the gain, where return rate = gain - 1, and the gain is defined as (the stock value at a date)/(the stock value at the start date).

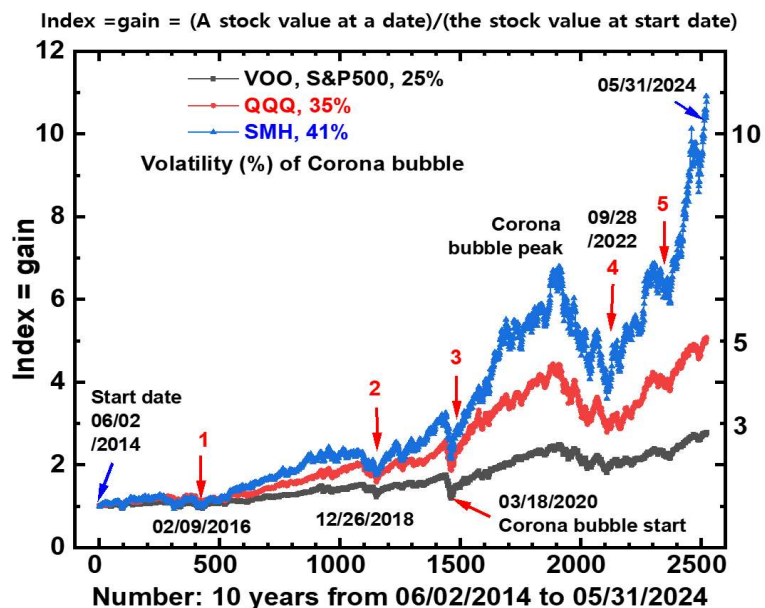


Figure 1: Gains as indices of famous ETFs (return rates): VOO (S&P 500), QQQ, and SMH. Gain is defined as (return rate) + 1. The index is defined by gain = (the stock value at a date) / (the stock value at the start date of 06/02/2014). The data were obtained from the historical data of Yahoo Finance.¹⁻³ Volatility is measured as the difference between the Corona bubble peak and the red arrow. This shows that a high-gain ETF has large volatility. SMH, QQQ, and VOO have gains of 10 times, 5 times, and about 2.8 times over 10 years, respectively.

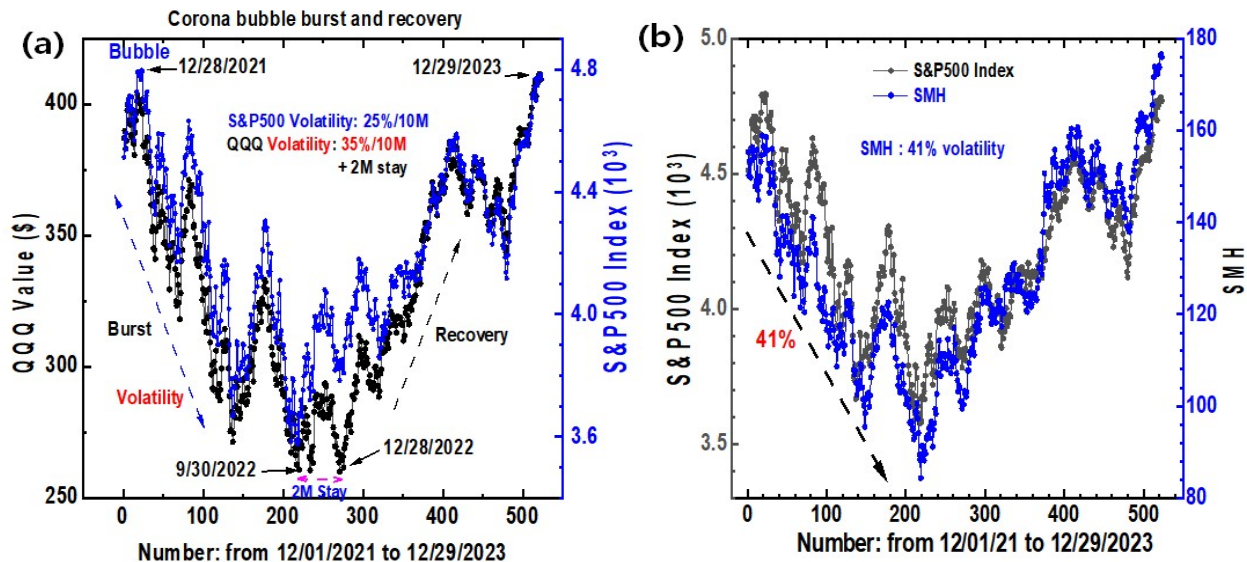


Figure 2. (a) Comparison of the volatilities of QQQ and the S&P 500 index between the bubble peak on 12/28/2021 and the minimum point on 9/30/2022. (b) Comparison of the volatilities of SMH and the S&P 500 index. The volatility of SMH, with a higher gain, is the largest at 41%. The data were obtained from the historical data of Yahoo Finance.¹⁻³

In exceptional circumstances such as the Corona bubble, ETFs exhibit large volatility, which adversely affects the snowball effect. We investigate the extent of the Corona volatility in prominent ETFs, specifically VOO (S&P 500), QQQ, and SMH, as illustrated in Fig. 2. VOO shows a decreasing volatility of 25% over approximately 10 months, but the decreasing volatility of QQQ is 35%, which is much worse than VOO. SMH, with its higher return rates, displayed about 41%. The behavior of SMH is similar to that of VOO, as displayed in Fig. 2(b).

We present an example of applying the SMH gain to the pension system, assuming that future economic conditions will be similar to those of the past 10 years. If the starting premium for the pension is \$1, the snowball effect will increase the premium to \$10 after 10 years, assuming a gain of 10 times that of SMH. After 20 years, with the starting premium at \$10, the increased premium becomes $\$10 \times 10 = \100 . After 30 years, the increased premium becomes $\$100 \times 10 = \$1,000$. After 40 years, the increased premium becomes $\$1,000 \times 10 = \$10,000$. At this point, some pension will be paid out, and the balance will be continuously rolled over. After 50, 60, 70, and 80 years, the pension amount will become significantly larger.

3. In conclusion

As the gain of an ETF increases, its volatility also increases, and vice versa. The monthly pension premium, which is periodically invested in the ETF, mitigates the threat posed by high volatility; the ETF remains stable over the long term, unlike individual stocks. High-yield ETFs such as SPY, VOO, XLK, QQQ, SOXX, SMH, and the in-testing HyTak are available. Despite the high volatility of SMH, the pension amount accrued through the snowball effect can be sufficient to sustain a comfortable life. Korean people must choose the DC system, independent of the issues of both a decreasing birth rate and an increasing elderly population, rather than the DB system, which is dependent on these issues. This approach could also be applied to other nations facing similar problems.

References

- ¹ Historical data of VOO in Yahoo Finance, <https://finance.yahoo.com/quote/VOO/>.
- ² Historical data of QQQ in Yahoo Finance, <https://finance.yahoo.com/quote/QQQ/>.
- ³ Historical data of SMH in Yahoo Finance, <https://finance.yahoo.com/quote/SMH/>.