Research on Choices of Investment Strategies

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Abstract—**The argument of whether the market is efficient has lasted for a long time and it is essential for an investor to determine what kind of investment strategy to choose facing different market effectiveness. It is valuable to determine which kind of strategy to use in different market stages.**

We would like to evaluate the performance of passive strategy, so we choose NASDAQ index ETF and HSI ETF as the representatives. The method of regression and tracking error are used and it is easy to get the conclusion that returns of ETFs follows the change of whole market and only a small amount of return could be earned.

Then, we should establish a mutual fund to evaluate the performance of aggressive strategy. To eliminate the influence of the extreme value and manipulation, the best choice is to construct a fund of fund using 4 dominant mutual funds and basing on Markowitz's portfolio theory, we construct a FOF and calculate daily return and evaluate risk with VaR.

After comparing the performance of the passive strategy and aggressive strategy, we find that the return of ETF and FOF display an opposite trend. This finding is consistent with behavior finance theory which holds the point of view that the effectiveness of the market changes with economic cycle.

In the end, it is easy to get the following conclusions: first, when the market enters the effective stage, passive strategy is economical and ideal; second, when the market is inefficient, aggressive strategy could bring extra return. These conclusions fill the gap between academy and industry and prove the research of behavior finance.

Keywords: positive strategy, negative strategy, VaR, portfolio management

I. Introduction

The idea of research on choices of investment strategies derive from an interesting argument between the academic circles and industry. As we all know, academic research always assumes that the market is completely perfect while in practice, from the perspective of industry, price cannot reflect all the information in the market and an aggressive investment strategy could always bring a positive premium return. Consequently, based on the arguments above, two kinds of investment ideas emerged.

According to the Efficient Market Hypothesis, or EMH, all the information is reflected into the market prices of the stock and equity. A premium investment strategy will not generate an excess return and no extra alpha will be gained. All the investors in the financial market will not earn excess return and face a same scenario. Thus, just following the market trend where index funds track a stock market index of the market and resisting the temptation to react or predict the next move in the stock market is an ideal investment strategy.

Stock prices cannot reflect all the information of the market, so the role of managers is attached much more importance. It aims to exceed the average return of the stock market by in-depth analysis and expertise and by taking full advantage of short-term price fluctuations. Managers should know when to move into or out of stocks, bond, or any asset. These portfolio managers try to determine when and where prices will change by studying qualitative and quantitative factors.

Thus, it is valuable to research on which strategies can perform better in the real world. Using NASDAQ ETF to evaluate the performance of Passive investment strategy and establishing a FOF to display Aggressive investment strategy.

II. The performance of passive strategy

We want to evaluate the performance of the passive strategy:

The first step is to collect the data of NASDAQ index and HSI as benchmark from 01/01/2019.

Then we would like to analyze the trend and give overall description of NASDAQ index and HIS.

Third, we pick suitable ETF and evaluate the return related to market index.

Finally, we use the method of tracking error to test the performance of passive strategy.

A. Data collection

It is easy to download the daily return of NASDAQ index and HSI from Yahoo finance and then using the daily return to calculate the monthly return and evaluate the performance of NASDAQ index and HSI with daily close-prices and monthly price limit.

B. Description of the market index

1) Trend analysis

At the end of the first quarter of this year, the yields on March and 10-year U.S. Treasury bonds inverted, causing widespread discussion in the market about the U.S. economic recession. ("Fig. 1")
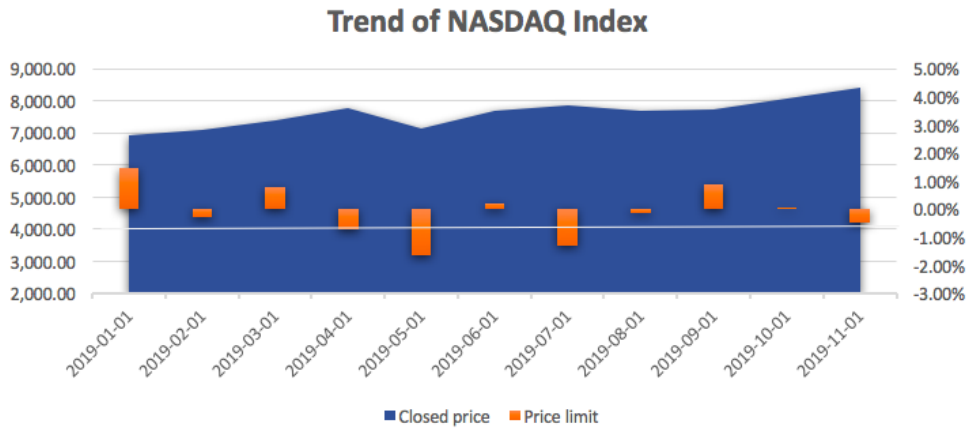

Fig. 1. Trend of NASDAQ Index.

Federal Reserve cut interest rates as scheduled in July, and the Nasdaq index showed a rising trend.

Since September, the Fed has cut interest rates again by 0.25%, hence the Nasdaq index shows volatile growth.

Fig. 2. Trend of HSI.

At the beginning, the valuation level of Hong Kong stocks was already in a historically low level, and the implementation of the central government's stimulating economic policies encouraged the market. ("Fig. 2")

There were several adverse signals in the market in the second quarter. The first was a major setback in Sino-U.S. Trade talks, and the two sides faced the risk of reciprocal tariffs.

The second was that China's macroeconomic data after May showed signs of a significant slowdown. This also means that the macro economy is facing a very unfavorable situation. Under the influence of these factors, the Hong Kong stock market has experienced a substantial retracement.

As the Sino-U.S. Trade war disrupted the market, the long-term and short-term yields of U.S. Treasury bonds fell,

U.S. stocks fell, Hong Kong stocks continued to fall to low level.

2) Performance of ETF

ETF can be conceptually regarded as a first set of index spot, in combination with the commodity characteristics of ETF itself that can be operated both long and short.

According to efficient market theory, investors do not get excess returns from securities analysis and should buy and hold index funds. That is what we called negative investment strategies. Hence, we choose two indexes ETF which follow the NASDAQ index and Hang Seng index

To make the chart more directly, we used two-week data here to present both ETFs.
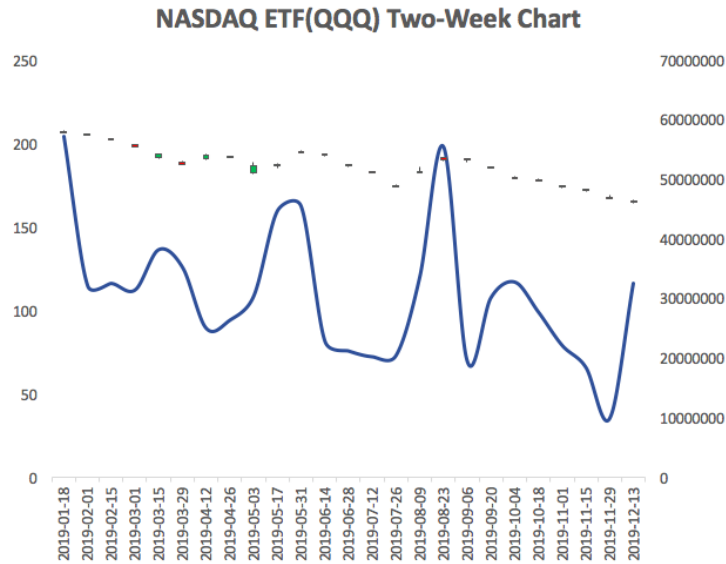
Fig. 3. NASDAQ ETF (QQQ) Two-week Chart.

According to the figure above ("Fig. 3"), QQQ ETF performed quite well in this year. The volume of QQQ was around $3 million and it nearly reached $6million at the middle of the first month of 2019, which means the liquidity of this ETF was quite attractive. Besides, the changes of price were also quite smooth and steady. It plays an important role in giving conservative investors great confidence to buy in this ETF.
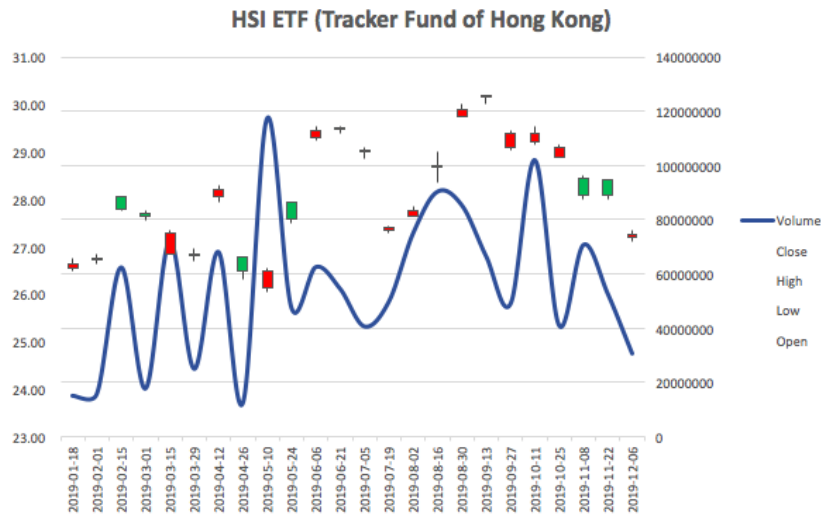

Fig. 4. HSI ETF (Tracker Fund of Hong Kong).

Since the ETF is related to the original index, due to the bad performance of Hang Seng Index this year, the overall trend of its ETF, Tracker Fund of Hong Kong, waves violently. Not only the price of Tracker Fund of Hong Kong, but its volume fluctuated al lot as well. The volume on April 26th fell at the rock bottom at around 10 million HKD, but reached the peak point of this year 2 weeks later. And the price was surprisingly following the trend of the volume. ("Fig. 4")

III. PASSIVE INVESTMENT STRATEGY ANALYSIS

A. Comparison of two ETFs

We Use the bi-weekly transaction data of two ETFs to calculate the return of these two funds, as shown in the figure below. Then we compare these two ETF, the average return of the NASDAQ index ETF and Hang Seng index ETF are 0.97% and -0.05% respectively. And the deviation of them are 0.1355 and 0.1571 respectively in general, due to market fluctuations, the returns of the two funds are not high.

B. *Tracking error*

Tracking error, which reports the difference between the return an investor receives and that of the benchmark they were attempting to imitate, is commonly used as a metric to measure ETF's performance. As we know, tracking error is the standard deviation of the difference between the returns of an investment or portfolio and its benchmark, which can be expressed as Tracking error=Standard Deviation of (P-B).

Calculated the active return as the daily return of QQQ minus the return of Nasdaq index. From the line chart below, it indicates that the active return of QQQ fluctuated greatly, which between 4% and -5%. ("Fig. 5")

Then we use the formula to get its tracking error which was 1.12%. It is rigorous to set the confident level as 95% to calculate its parametric and non-parametric tracking error was 1.84% and 1.74%, respectively. ("Fig. 6")
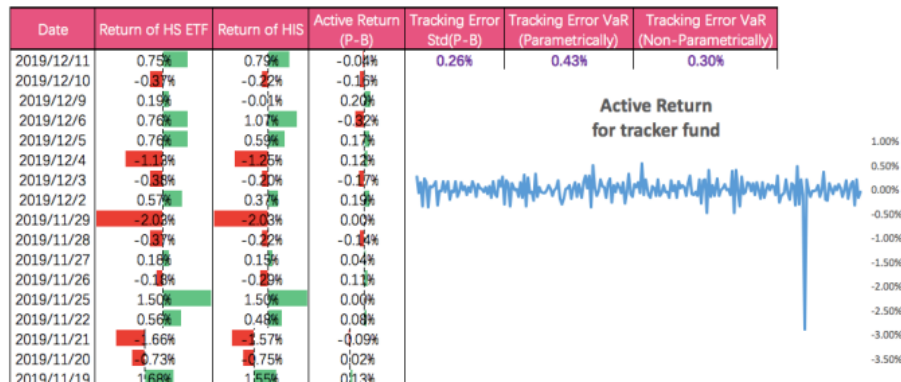

Fig. 5.　Active return for QQQ.

Fig. 6.　Active return for Tracker Fund of Hong Kong.

The active return of this ETF was quite flat all over the year, except on Oct 31st was downtrend at -2.8%. Besides, its tracking error, parametric and non-parametric tracking error were respectively at 0.26%, 0.43% and 0.30%, which are far smaller than the number of QQQ. It shows that Tracker Fund of Hong Kong had a better performance in the past year.

IV.　AGGRESSIVE INVESTMENT STRATEGY

A. *Mutual fund construction*

1) Selection of funds: According to the Zacks Mutual Fund Rank, which is not only focus on past performance but on the future success of the fund, picked out 4 most promising aggressive funds ("Fig. 7").

Fig. 7.　Four most promising aggressive funds.

These four funds seek long-term capital appreciation by investing in a diversified group of emerging businesses like healthcare and technology. These businesses usually have a high probability of accelerating earnings growth that depend on factors such as reformed management, new products and services or structural changes in the economy. In this way, FOF is fully diversified.

2) FOF construction: Given the 4 individual assets are picked, download the daily close prices of 4 individual funds from Yahoo Finance between 2018/12/17 and 2019/12/14. To establish the FOF, daily return should be calculated with the formula:

Daily return = (close price-open price)/open price

To establish a FOF, we use the following formulas:

$$s = \frac{\text{Portfolio risk premium}}{\text{standard deviation of portfolio excess return}} = \frac{E(rp) - rf}{\sigma p}$$

$$E(Rp) = \sum_{i=1}^{N} W_i E(R_i)$$

$$Var(R_p) = \sum_{i=1}^{N} \sum_{j=1}^{N} w_i w_j \sigma_{ij}$$

$$E(rp) = w_B E(r_B) + w_s E(r_s)$$

$$\sigma_p^2 = (w_B \sigma_B)^2 + (w_S \sigma_S)^2 + 2(w_B \sigma_B)(w_S \sigma_S)\rho_{BS}$$

After calculation of the covariance matrix, draw the efficient frontier to construct the optimal portfolio. Use total of 20 scenarios to draw the efficient frontier. Considered the shape of the fitted line, display the first half of the fitted picture ("Fig. 8"):
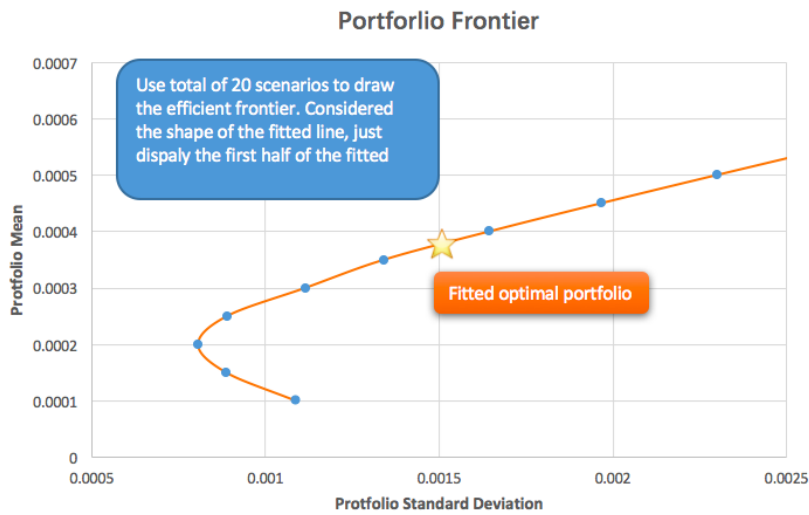

Fig. 8.   Portforlio Frontier.

V.   RISK ANALYSIS

After the establishment of the optimal portfolio, testing the risk of this portfolio is an essential part to evaluate the efficiency of the aggressive strategy ("Fig. 9"):

Credit VaR = q(CL) – EL

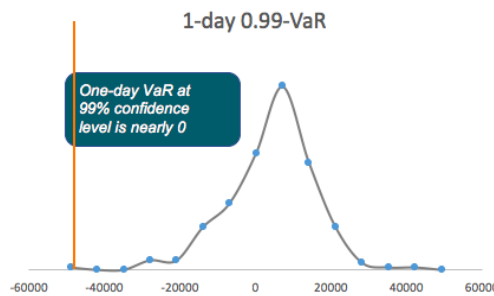We use Excel to calculate the 1-day 0.99-VaR and 10-day 0.99-VaR:

Fig. 9.   1-day VaR.

Then, we summarize the calculation data of constructed FOF ("Fig. 10"):

Fig. 10. Summary

VI. COMPARISON

Step1: We use the function of OFFSET to match the data time to create standard time-series data ("Fig. 11").

Step2: Then, we insert the daily return of FOF return and ETF return in chronological order.

Fig. 11. OFFSET

Step3: We draw a picture to show the difference of these two portfolios and the discrepancy is filled with light blue ("Fig. 12").
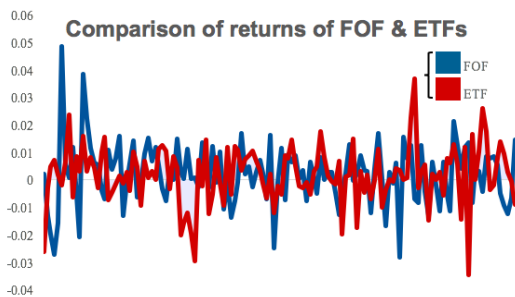

Fig. 12. Comparison of returns of FOF&ETFs.

VII. CONCLUSION

A. Findings of research

From the above picture, it is obvious that returns of FOF and ETFs show a totally different changing trend: when the return of FOF is high, the return of ETFs keeps on a relatively low level; if the return of FOF is very low, the return of ETFs increases dramatically.

This conclusion is consistent with the findings of behavioral finance. According to the behavior finance, the efficiency of market change with the economic cycle. The market efficiency and inefficiency takes place in turn, alternatively.

This finding contacts the efficient market hypothesis in academic area and the real world in industry. Passive strategy is recommended when the economy into the period of efficient market and the aggressive strategy could earn a higher return when the market is not efficient enough.

B. Brief bridge of behavior finance

Behavior finance study for the behavior of the practitioners in the financial market. In traditional economic theory, all the investors are rational and they always make decisions based on their needs and demanding. But in reality, things are different, not all the investors are rational, but complicated. Thus, behavior finance could explain what happened in the real world and the bias.

Behavior finance fills the gap between the efficiency market hypothesis and the real world. It explains the market chaos and the economic crisis in industry and this discrepancy could be explained by behavior finance.

The findings of behavior finance are consistent with the above research:

When the market is efficiency, according to the efficiency market hypothesis, all the information has been reflected in the stock prices. Thus, technical analysis is useless, just following the change of the market is a wise choice for all the investors, no extra return and premium can be realized. Consequently, passive strategy not only money-saving and it is easy to implement for all the investors with different background and information.

When the market is inefficiency, like some political impact and some government regulation, the assets prices deviate from the real value. This situation offers good opportunities for smart investors to earn an extra value with more inside-information and qualified technical analysis ability. Under such circumstance, aggressive strategy can distinguish the naïve investors and the wise investors. Although passive strategy in such situation follows the market and earns an average return of the whole market, aggressive one provides the possibility to earn far more profits than imagine.

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