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改良式定時定額投資法-限時限額加碼停利

Enhanced Dollar-Cost-Averaging - an improvement
for current mutual fund investment strategy



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本論文係劉麗雯君 (r97749022) 在國立臺灣大學企業管理碩士專班、所完成之碩士學位論文，於民國 101 年 01 月 20 日承下列考試委員審查通過及口試及格，特此證明

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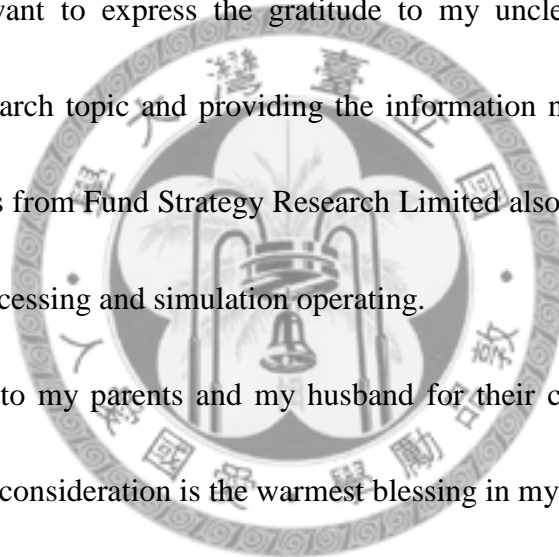
It's a great experience to back to school again and join the GMBA program in NTU.

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中文摘要

共同基金是許多投資人喜愛的理財工具，其中定期定額方式更多數人在投資共同基金時考慮選擇之主流方式；而定期定額受歡迎之原因，除了透過小額定期扣款的機制可達成類似零存整付的強迫儲蓄功能外，定期定額投資不需要考慮進場時機，有效降低投資人對於做出錯誤投資決策的焦慮心理，亦可降低購買成本及風險，更重要的是投資時間越長，投資人越可享受時間的複利效果。

但本研究透過模擬定期定額投資台灣加權股價指數與其他共同基金的結果，證實多數投資人透過定期定額投資通常無法得到該基金所宣稱的獲利，同時在沒有適當機制管理定期定額投資的情況下，長時間定期定額投資的結果與投資人原先期待可以累積的財富有相當大的落差。而投資人對於定期定額投資的信心，事實上也受到投資過程中，投資部位所遭遇的損失幅度與其持續期間之影響，但一般投資人通常僅了解所投資基金過去的績效，並不會了解在投資之後可能須要忍受的最大損失程度，進而也影響了投資人在市場下跌時繼續堅持定期定額投資之意願。

本研究認為現有定期定額投資方式有其隱含的缺陷，譬如忽略了投資人投資生命與投資資本有限的事實，對於如何獲利缺乏明確的指引，同時也沒有可靠的方法協助投資人度過市場下跌的危機。故本研究重點在於提出改良式之定期定額投資方式，透過限時、限額、加碼、停利之核心概念，建構投資人可重覆執行之投資策略；主要在有限資本與時間的考量下，提高資金利用之效率，避免投資人因過早投入太多資金而造成資金短缺被迫須終止投資計畫，在市場下跌時積極增加投資部位並在適當時機停利，以確保投資期間累積之獲利可以真正實現，進而提升共同基金之投資績效。本研究以股票型基金進行模擬投資測試結果，證實改良式定期定額方式之內部投資報酬率均優於定期定額投資。

關鍵字：定期定額投資、改良式定期定額投資、停利、波動度

Abstract

Among the various financial instruments available in the market nowadays, mutual fund has become one of the most well-know and preferred investment choice for investors to manage their wealth. By investing in mutual fund, investors could enjoy the benefits of portfolio diversification, high liquidity of investment position, and professional management. Meanwhile, other factors such as the forceful marketing by banks, securities investment trust/consulting enterprises (SITE & SICE) or even financial consultants, as well as the convenient mechanism of application and redemption channel also contribute to the popularity of mutual fund investment.

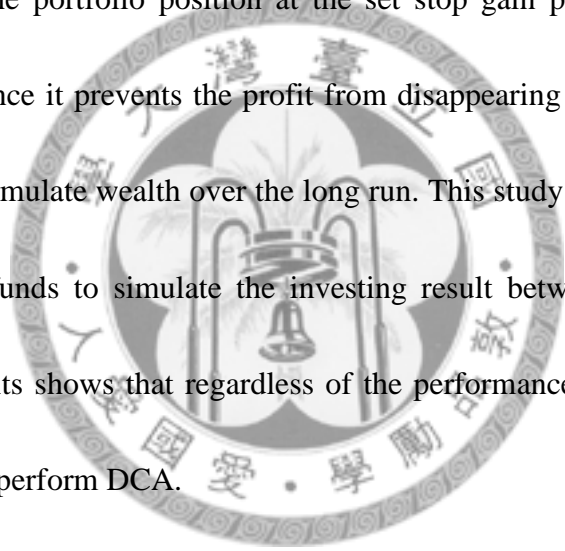
Two main strategies are normally utilized in the mutual funds investment, Lump-Sum (LS) and Dollar-Cost-Averaging (DCA) strategy. Though the debate over which one has superior performance lingers for a long time and literatures in late period seem to prove that LS strategy could perform better, it's undeniable that DCA is the mainstream strategy of mutual fund investment. Several reasons could explain why DCA becomes investors' favorite investing strategy. First, the mechanism of regular deduction at agreed period resembles the concept of club deposit and it facilitates to achieve the forced saving plans. Second, monthly (or other regular intervals) contribution avoid the market-timing problem and also lessen the anxiety of making investment decisions. Then, based on the perception from most investors, DCA strategy could average the cost,

reduce the investing risk, and the investing position could enjoy the power of compound interest over the long run.

However, the generally accepted concept that investors could make profit or accumulate expected wealth simply by following current DCA strategy is questionable. According to the simulation results in this study, it proves that the mechanism of current DCA strategy is not sufficient to help investors to make profit, and it is also not an appropriate investing toll for long-term investment without proper management. When investor decides to utilize DCA to invest in mutual funds, the information he will receive usually is the fund performance in the past. But investors is totally unaware of the fact that before his investing portfolio could make expected profit, to what degree the volatility he needs to tolerate? Meaning what's the maximum investment loss he might need to put up with? And how long will the investment loss last? These are important factors to impact investor's attitude toward his investing plan and also affect investor's faith to stick to the strategy, which happens to be the key to the success of DCA strategy.

By simulating DCA in Taiwan Weighted Stock Index, this study believes that current DCA strategy contains some fallacy conception, such as negligence about the limits of investing life and capital constraints, lacking of clear method to realize profit, and being trapped in the bear market. To improve the investing strategy in mutual fund investment

under the purpose of making profit, this study suggests the Enhanced Dollar-Cost-Averaging (EDCA[®])¹ strategy to make up for the deficiencies in current mechanism. Briefly speaking, EDCA requires investors to weight the investing duration and the available capital before deciding the monthly deduction amount. Then, sticking to the investing plan and increasing the monthly deduction amount in the bear market are crucial to accumulate investing position quickly and further lower the average cost. At last, redeeming the portfolio position at the set stop gain point is the key to the success of EDCA, since it prevents the profit from disappearing with market volatility and facilitates to accumulate wealth over the long run. This study utilizes historical data of different mutual funds to simulate the investing result between DCA and EDCA strategy and the results shows that regardless of the performance of individual mutual fund, EDCA does outperform DCA.



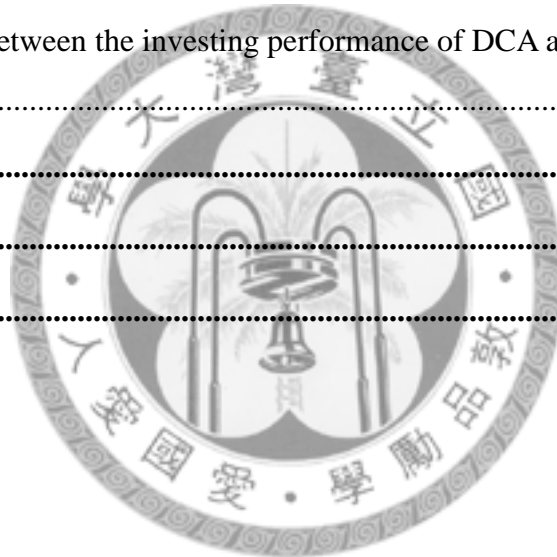
Keywords : Dollar-Cost-Averaging, Enhanced Dollar-Cost-Averaging, Stop gain, Volatility

¹ Enhanced Dollar Cost Averaging (EDCA[®]) is registered by Fund Strategy Research Limited (誠富財務管理策略研究股份有限公司)

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Chapter 1 Introduction

Mutual fund has been widely accepted as an alternative investment instruments beyond Term Deposit and Stock in Taiwan. According to the 2009 Fund Investment Behavior and SICE (Securities Investment Consulting Enterprises) Industry Perception Survey, conducted by the Securities Investment Trust & Consulting Association of R.O.C (SITCA), 36.2% of the interviewee used to invest in mutual fund and the proportion is quite close to the other two commonly-used investment instruments, stocks(38.6%) and Chinese Money-loan Associations(39.6%). Meanwhile, for those who invest in mutual fund, DCA is still the most prevalent method to utilize and it accounts for 78.2% on the mutual fund investment.

Indeed, there are quite a few benefits to invest in mutual fund. Diversification could be one of the most frequently mentioned characteristics in mutual fund investments.

Mutual funds are in fact the investment portfolios of stocks, bonds and money market instruments and investors own a pro rata share of the overall portfolio. Therefore, the risk is somewhat limited since a decline in the value of any specific security is offset by the stability or increasing value of other securities in the portfolio. Then, mutual fund is managed by professional fund managers, who manage and supervise the mutual funds, decide when to buy or sell securities according to the prevailing market conditions. For investors who lack time or knowledge to manage their investment, professional

management provides a good opportunity to participate in the market. Meanwhile, mutual funds allow investors to begin with little amount of capital, say NTD 3,000 is the basic required amount to invest domestic mutual fund in Taiwan through Dollar-Cost-Averaging method. Not only easy to access, mutual fund is also highly liquid, investors could redeem the fund at any business day and the proceeds will be in the investor's account within a few days. Given the advantages that mutual fund has, it has become popular investment instrument in Taiwan.

The typical choices for investors to invest in mutual fund are Lump-Sum investing (LS) and Dollar-Cost-Averaging (DCA) strategy. LS requires investors to disburse their available cash into specific mutual fund up front. Contrary to the concept of investing money at the same time, DCA allows individual to invest the same amount of money at regular intervals, such as weeks or one month. According to the survey conducted by SITCA in 2009, most investors in Taiwan market who have invested in mutual fund used to utilize DCA and the proportion accounts for 78.2%. This tells that in terms of mutual fund investment, DCA is a more stable strategy from investors' perception.

Although many literatures argue whether DCA performs better than LS, DCA still has its advantages. For example, DCA could help to reduce the risks of equity investment by ensuring that the entire portfolio of stocks will not be purchased at temporarily inflated prices (Malkiel, 1975). Meanwhile, DCA also helps to lower the cost by

sticking to the schedule, meaning to buy even though the price keeps falling. It brings the average cost down and any subsequent rise will yield a significant capital gain (Cohen, Zinbarg, & Zeikel, 1977). This depicts some of the most important characteristics of DCA strategy and also lets us understand why DCA is the most welcomed investment strategy in mutual fund.

First, it's difficult for individual investor to decide the appropriate time to buy. DCA, on the other hand, requires investors to make small, but regular investments and therefore, the current market condition could be disregarded. Next, with the mechanism to deduct money automatically at regular intervals, investors purchase more shares when the prices are low and few shares if the prices are high, which lowers the average cost and eliminates emotions out of investment decision making. Based on the concept, many financial consultants advocate the advantage of DCA strategy in mutual fund investment including average the holding cost, lower the risk of market volatility and enjoy the benefit of compound interest. Furthermore, DCA is also been regarded as a suitable strategy for the long-run investment since it resembles the idea of fixed deposit by installment. All these characteristics make DCA an attractive investment strategy over the long run for investors.

This study wants to examine whether investors could be benefit from DCA as financial consultants claimed or as what the banks or companies of securities investment trust and

consulting propagate. What's the myth and dilemma that investors might face when implementing DCA strategy? And is there any practical way that investors could execute out of current automatic deduction mechanism provided by banks?

The outline of this study includes,

Chapter 1, Introduction

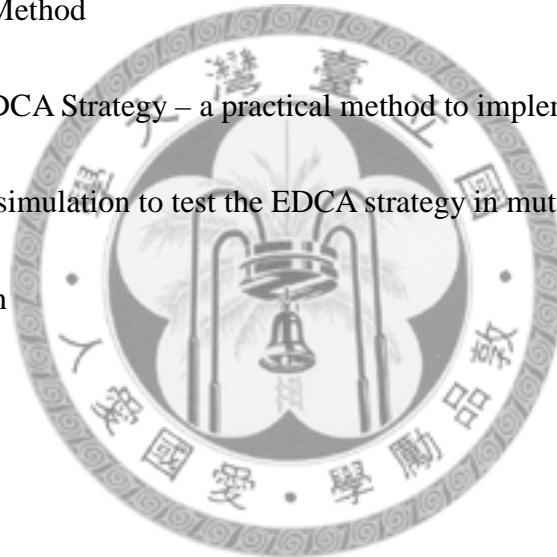
Chapter 2, Literature Review

Chapter 3, Research Method

Chapter 4, Enhanced DCA Strategy – a practical method to implement DCA strategy

Chapter 5, Empirical simulation to test the EDCA strategy in mutual fund investment

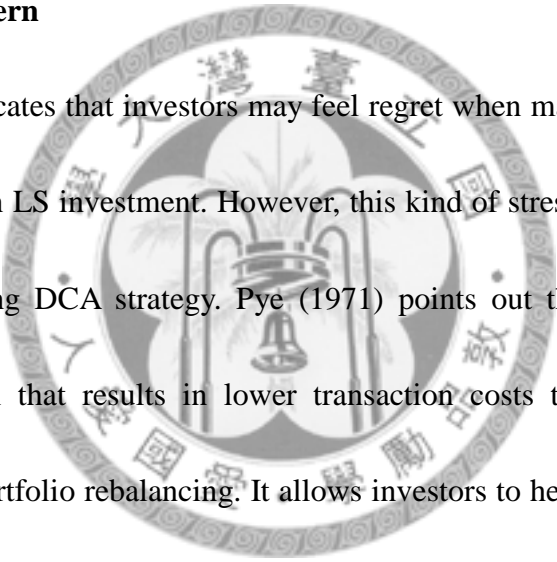
Chapter 6, Conclusion



Ch2 Literatures Review

This chapter wants to discuss relevant literatures from the perspective of investors' psychology and behavioral pattern, investment performance evaluation about LS and DCA strategy, as well as related arguments about how to improve DCA's mechanism to get better investing performances.

2.1 The value of the DCA based on the analysis of investors' psychology and behavioral pattern



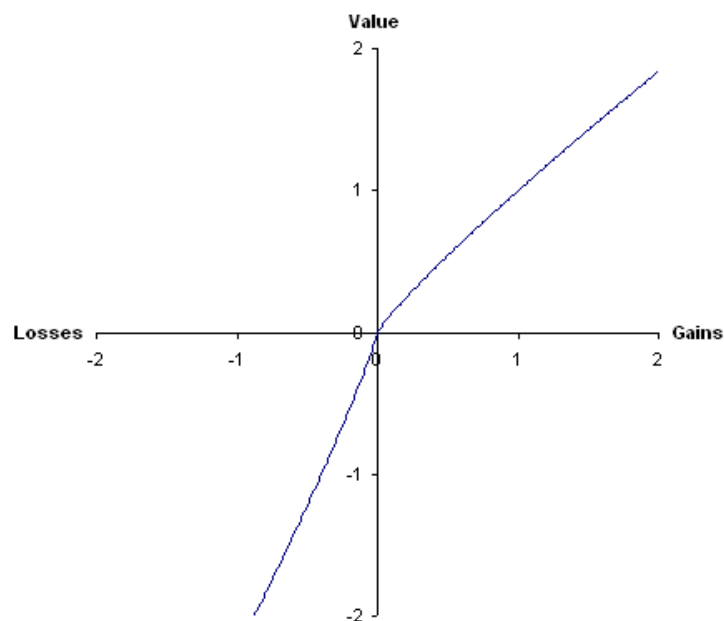
Some literature indicates that investors may feel regret when making an inappropriate or wrong decision in LS investment. However, this kind of stress could be relieved or lessened by choosing DCA strategy. Pye (1971) points out that DCA is a simple, forced savings plan that results in lower transaction costs than with a plan that requires frequent portfolio rebalancing. It allows investors to hedge against regret that results from investing a lump sum during a market high. For investors, regret may arise from two aspects, choosing to disburse money into the market at the timing that was proven to be the market high later or miss the opportunity to enter the market when the market fell to the low level. Most utility function fails to take this negative factor into consideration. However, if we assume that the purpose of making investment is to improve individual's utility, then to alleviate investor's psychological stress should be regarded as a helpful method to achieve the purpose. Therefore, to

reduce or avoid the feeling of regret is an important factor for investors to consider when choosing the investment strategy. Pye argues that DCA is a nonsequential minimax strategy when the largest possible price rise is equal to the largest possible price decline in each investing period. Since DCA requires investors to invest regularly at a fixed amount without considering the fluctuations of future prices, to hedge against regrets or opportunity losses would be an important factor when choosing DCA strategy. However, Pye also mentions that DCA cannot hedge against unfavorable outcomes.

Kahneman and Tversky (1979) presented an alternative model of decision making under risk, the prospect theory, as a critique to the expected utility function. Empirical study reveals that people are risk-seeking under some circumstances whereas risk-averse in other scenario and this cannot be explained by the expected utility function. Meanwhile, people are not as rational as traditionally assumed to be and will over-react or slow-react when making investment decisions. Moreover, framing do affect investors' choices. Therefore, under prospect theory, value is assigned to gains and losses rather than to final assets; also probabilities are replaced by decision weights. The value function is defined on deviations from a reference point because in terms of investors' attitude toward risks, a reference point, rather than the terminal wealth, will be considered to evaluate the gains or losses. The value function is

S-shaped, normally concave for gains (implying risk aversion), commonly convex for losses (risk seeking) and is generally steeper for losses than for gains (loss aversion) (Figure 2-1). This illustrates that investors are more sensitive in marginal loss than in marginal gain, implying the regret from one unit of loss is larger than the happiness from one unit of gain. Any unfavorable outcomes resulted from investment decisions will lead to the feeling of regret and pain for investors. However, this psychological stress could be averaged by the disciplined investment strategy such as DCA.

Figure 2-1 The Value Function under prospect theory



Source : Kahneman, D., and Taversky, A., "Prospect Theory : An Analysis of Decision Making Under

Risk," *Econometrica* vol.47 no.2, March, 1979, pp.263-291

Statman (1995) introduces a behavioral rationale for the existence of DCA. He agrees that the nonsequential nature of DCA, namely to invest fixed amount at predetermined

point of time in a disciplined fashion, is the key to its success. The study emphasizes on the behavioral framework of prospect theory, aversion to regret, cognitive errors and self-control. He argues that LS investment frames in standard finance way while DCA investment frames in behavioral finance way. The loss for LS investment could turn out to be a gain for DCA investment due to different frames. Meanwhile, he also points out that “the joy of pride and the pain of regret” do matter in the behavioral finance, whereas either the pride or the regret will not influence the choice of investors in the standard finance. It’s obvious that investors will feel regret when suffer a market drop in LS investment. However, DCA strategy could help to reduce the level of regret. Moreover, due to the close connection of regret and the level of responsibility, DCA’s rule also facilitates to lessen the level of responsibility. Therefore, Statman believes investors who follow a rule such as that imposed by DCA feel removed from some of the responsibility of a bad investment outcome and experience a reduction in regret. Meanwhile, the cognitive errors occur when the initial investment plan is no longer attractive and investors may try to use a new plan to substitute the original one. It’s inevitable to face self-control problem for investors when making any investment choices but the rules of DCA prevent investors from terminating investment plans and thus control the self-control issue. Furthermore, DCA could be regarded as a useful tool to enforce savings plan. As a consequence,

DCA strategy is more attractive than LS strategy and investors' aversion to loss and reliance upon rules to minimize regret help to theoretically explain the persistence of the DCA method of investing.

2.2 The investment performance evaluation about DCA

The research on the performance of DCA strategy yields mixed results. Some literature thought DCA is a superior strategy compared with LS strategy since it can reduce investment risk without sacrificing much return. Whereas some questions its effectiveness and argues DCA has no value. Some literatures also point out DCA could be both superior and inferior. In this section, this study wants to introduce the different viewpoints in terms of the performance of DCA and also points out the way that has been raised in different literatures to evaluate the DCA investment performance.

In view of return and risk, Israelsen (1999) studies the annual holding period returns for 35 of the largest equity funds over 1988-1998. The DCA investing strategy leads to higher average annualized returns for 19 of the 35 funds. Meanwhile, those funds with superior returns by using DCA strategy are associated with characteristics such as lower standard deviation, lower return by using LS strategy, and large amount of dividend distributions. The study concludes that DCA is a superior strategy for funds with low volatility while LS is best for volatile funds.

Milevsky and Posner (2003) also find DCA to be superior to LS strategy, especially for volatile securities when the investment ends up with a zero return or with a loss. They find out that investing by DCA strategy is the same as purchasing a type of derivative on the underlying stock. In the condition that the terminal value of the underlying security is the same as its initial value, the expected return from DCA is “uniformly positive” and higher than the expected return from LS investment. Moreover, this conditional expected return will increase with the level of the volatility. The higher the volatility, the better the conditional expected return of DCA relative to LS. This conditional effect is consistent with behavioral finance since investors have “target prices” for the final value of the underlying security.

With respect to the risk concerns, Bernstein (2003) recommends DCA is a good strategy for retirement investment. He states that DCA is a form of diversification which facilitates to lower investment risk over time. Then, the mechanism of DCA to buy more shares when price is low and few shares when price goes up lead to lower total cost. Also, investors could be benefit from the shares that is purchased at relative low prices when the market recovers. Furthermore, investors do not need to worry about the market timing since DCA protect them from investing money at one time when market may drop later. Tacchino and Woerheide (2005) also recommend DCA to be one of the retirement investment strategies. Due to DCA’s nonsequential nature,

investors could reduce the frequency of investment portfolios reviewing which may cause losses in the investment of retirement savings. And again, no need to consider the market timing is another advantage mentioned in their findings.

Other literatures argue that DCA strategy is suboptimal policy or even conclude it has no value. Constantindes (1979) points out DCA has two properties. One property is DCA's nonsequential nature and which is considered to be the key to its success. The investors need to have the courage to stick to the plan even though the price keeps falling. Given that, investors could lower the average cost and be benefit from the capital gain yielded from subsequent rise in the market. Another property states that DCA policy depends not only on the total wealth of the investor but also on the composition of his wealth. However, DCA will be dominated by the sequential optimal investment policy when the market is inefficient because the sequential optimal investment could exploit the market inefficiency to make future decisions based on other new and beneficial information available in the future. He also states that the fault of DCA's argument is misrepresentation of the state of the world before a decision is made.

Williams & Bacon (1993) utilize S&P 500 index and 90-day T-bills from 1926 to 1991 to compare the annualized return of DCA strategy with LS strategy. S&P 500 index is denoted as the market combinations and 90-day T-bills represents risk-free

interest. Their study assumes holding period is 12 months and DCA works in the way that the funds were initially invested in Treasury bills and periodically transferred to the stock market in equal amount without considering taxes and transaction costs. The result reveals that LS outperforms DCA strategy in nearly 2/3 of the period since the positive premium existed in most of investing period and it results in higher opportunity cost associated with holding the funds in the risk-free asset instead of investing in the risky assets. Therefore, the sooner the entire endowment is fully invested in the market, the higher the realized return would be. Investors should make investment as soon as possible.

Thorley (1994) argues the misconceptions and fallacy of DCA and concludes that DCA has no value. In his study, DCA strategy is compared with other investment strategies, Value Averaging (VA) and Buy and Hold (BH) strategy. VA strategy implies that more money was invested in months following a month with negative returns and less money was invested in months following a month with positive returns. Investors would be investing more after markets have gone down and less when markets go up. Therefore, Thorley argues that DCA can be dominated by VA since VA has even lower average cost per share. He questions the studies that support DCA as a superior strategy due to its lower average cost per share compared to average price per share. Since the investors can only sell their shares at current price rather than the average

historical price, their total return from the DCA investment cannot be maximized by the difference between the cost per share and the average price per share. Therefore, what conventionally believed that investors could benefit from lowering cost average by DCA strategy is actually a misconception. Another investment strategy, BH strategy, is a long-term investment strategy based on the view that in the long run financial markets give a good rate of return despite periods of volatility or decline. This viewpoint also holds that short-term market timing, i.e. the concept that one can enter the market on the lows and sell on the highs, does not work; attempting timing gives negative results, at least for small or unsophisticated investors. Besides the advantage to avoid from mis-timing, BH strategy also has lower transaction costs. By using historical data of S&P 500 index from 1926 to 1992, Thorley finds out DCA has lower means and higher standard deviations than BH strategy. Therefore, he concludes that DCA is inferior to other investment strategies in terms of return and risk. The popularity of DCA may be due to its disciplined rules that help investors to reinforce their self-control, which prevents them from disrupting saving plans or consuming all earnings at once.

Leggio and Lien (2001) also state that DCA is inferior to LS, BH, and VA strategy. By testing S&P 500 stocks and small company stocks from 1970 to 1999, they find that DCA is not a mean-variance efficient strategy comparing to the other alternatives. The

test indicates LS has the highest excess return for both S&P 500 stocks and small company stocks and BH strategy also outperforms DCA in all the cases. This is because DCA reserves most of the funds in Treasury bills for most of the periods which earns no excess return. Only VA yields lower excess return than DCA in S&P 500 stocks. With respect to risk, LS has the highest standard deviation as expected whereas DCA is the next one, even higher than BH and VA strategy. It supports that DCA is not a mean-variance efficient choice. Furthermore, they apply the prospect theory value function to test the inefficiency of DCA. The result shows that the value functions for both LS and BH strategies are higher than that of DCA in S&P 500 stocks and small company stocks and DCA is the only strategy with negative value for small capital stocks. The inferiority of DCA could be attributed to its investing rationale, it holds large amount of funds in risk-free asset and the funds are transferred to risky asset slowly. Investors not only suffer from downside investment risk of small capital stocks, but also lose the opportunity to earn excess return from the upside potential of small capital stocks. Therefore, from the perspective of prospect theory value function, DCA is still not an efficient investment strategy.

2.3 Arguments about how to improve DCA's mechanism to get better investing performances

Due to the doubt over the performance of DCA strategy in mutual fund investments,

there are many literatures raising different kinds of improvements and trying to enhance the profitability of mutual fund investment.

Shiau (2008) utilizes Taiwan stock mutual funds to explain the relationship between the economic indicators and implementation of DCA strategy. The author suggests that the “annualized 6-month rate of change of composite leading index“ is an appropriate economic indicator for considering the switch of DCA strategy. Investors should maintain monthly deduction when the figures of the economic indicators increase comparing to the previous period. But when the economic indicators reverses, monthly deduction should be halted and investors could redeem the portfolio position. The proceeds is reserved as cash and combined with the amount that was scheduled to be deducted monthly but ceased temporarily due to the downside of economic indicators, investors should invest the whole amount again in the first month when the DCA strategy resumes at the time when the economic indicators is better off. Repeating the suggested switch strategy, the return will be superior to the traditional DCA strategy which simply sticks to fixed monthly deduction plan.

Wu (2010) bases on the trend of Taiwan Index and the size of onshore mutual funds, combining with average Taiwan index and economic indicators in last decade to decide the timing and the amount of investment in Taiwan stock mutual funds. The empirical test reveals that the investing performance is better if investors utilize the

Monitoring indicators (Total Score) as a reference indicator and adopt fixed amount but non-fixed term investing strategy. When the total score is higher than the average score of last decade, investors should halt investment otherwise investors should keep investing with fixed amount when it is lower. Then redemption is necessary when market hits high point. Given that, investors could utilize mutual fund as a long-term investing tool more easily.

Hsieh (2008) studies the relationship among the investment timing of mutual funds (namely the deduction timing of DCA), the investment strategy and the rate of return.

The study finds out that in terms of DCA strategy, when the deduction date is on the 26th, 27th, and 28th day of each month, the rate of return tends to be higher. Meanwhile, the study also indicates that the stochastic indicators (KD) of Taiwan Weighted Stock Index is a good reference to decide the deduction amount and redemption timing of DCA strategy. When KD signals to buy, investors should double or triple their deduction amount in order to lower the cost. Then, redeeming the portfolio position when KD signals to sell. By utilizing the variations of KD indicators, investors could effectively enhance the rate of return of mutual fund investments.

Li (2005) and Sun (2007) studies the mutual fund investing strategies and indicates that fixed term but non-fixed amount investment is better than the traditional DCA strategy (fixed term and fixed amount). Since the fixed term but non-fixed amount

investment strategy will adjust the deduction amount with the volatility of stock market, the possibility of loss may exist. However, when the investing duration is prolonged to at least 5 years, the probability of profit is much higher than that of other investing strategies, such as LS or DCA strategy.

Fu (2009) claims that LS performs better than that of DCA strategy when investing period is relatively short with respect to mutual funds in the same category. But when the investing period is longer, DCA strategy will prove its superiority in profitability since it facilitates the cost-averaging effect and enhance the rate of return with time effect and business cycle. Meanwhile, DCA investors could enjoy the better yield if they could activate redemption and halt deduction when market hit high point and more importantly, keep the faith to stick to the investing plan when market is in the downturn.

Chang (2005) studies whether the execution of stop gain rules on DCA strategy could help investors to make better profit in the capital market. The study reveals that the average rate of return is higher for DCA strategy with stop gain mechanism. Meanwhile, if the investing target is Index funds, the author suggests that investor should utilize DCA strategy and set the stop gain rules. The appropriate stop gain point for DCA strategy in Index fund is 10% when investing period is less than 2 years, 5% when investing period is 2 to 4 years, and 20% when investing period is

over 5 years.



Ch3 Research Method

Literature reviews tell that the debate over the superiority or inferiority about DCA strategy exists for a long time. Earlier studies support DCA as a disciplined strategy that facilitates to lower average cost, avoid market timing problem, and also reduce investors' regret or responsibilities about making wrong decisions. But still many literatures argue that DCA is not an efficient strategy and its performance is outperformed by other alternatives such LS, BH, and VA strategies. Though the simulation from historical data reveals that DCA could not earn excess return as investors expected, we cannot ignore the fact the DCA is still the mainstream strategy in mutual fund investments. According to the survey result conducted by SITCA in 2008, among those who invest in mutual funds, 78.2% utilize DCA while only 36.6% use LS strategy. However, the question is whether investors do benefit from DCA strategy in mutual fund investment? Is there a systematic method that could help investors earning expected return out of current DCA investment mechanism provided by banks, securities investment trust/consulting enterprises?

There are also literatures providing other suggestions to improve the performance of DCA strategy, including utilization of economic indicators to decide the investment and redemption timing, stop gain point mechanism, fixed term and non fixed amount strategy, and etc. But the improvements often require investors to actively adjust their

investing strategies based on the market or economic conditions which apparently is not an easy task for many investors. One of the reasons for DCA's popularity is its simplicity in use and no need to pay much attention on the switch of investing strategies. Therefore, this study wants to provide a practical method that investors could apply it to the current DCA application or redemption channel provided by the banks or securities investment trust/consulting enterprises.

In this chapter, this study will exploit the investing dilemma that investors might face when making investment decisions by comparing the LS and Periodic strategies. Then, by simulating DCA strategy on TWSI and Capital Marathon Fund to explain the misconceptions that investors usually have toward DCA strategy. Last section is the analysis about the embedded pitfalls of current DCA mechanism.

Ch3.1 Investment dilemma – a comparison between LS and Periodic Strategies

Ch3.2 Misconceptions about DCA strategy – by simulating DCA on Taiwan Weighted Stock Index and Capital Marathon Fund

Ch3.3 Analysis of the embedded pitfalls of current DCA mechanism

3.1 Investment dilemma – a comparison between LS and Periodic Strategies

In July of 1, 1988, Money magazine published a special report headlined “Beyond Dollar-Cost Averaging.” The author, Mr. Clint Willis, mentioned that there are no

magic formulas to transmute investments into big profits, but strategies, including sophisticated variation of the DCA, could help investors reducing investment risks while also offering an excellent chance for above-average capital gains. Of course, investors could earn excess profit if they enter the market in the early stage of 1982 and sell their stock before the crash in U.S. stock market on October, 1987. But what investors need to earn this profit is incredible luck since for those who put their money into the market at once actually can never be sure which direction the prices will go. For example, if anyone puts his money into the market around October of 1987, then, he could suffer 25% loss or much more within a couple of days since the stock market crashed with S&P 500 stock market index falling about 20% on October 19, 1987. To avoid this kind of disaster, the author recommended buying shares on the installment plan, namely periodic strategies. There are five periodic strategies introduced in this special report and were applied to the Vanguard Index that tracks the S&P 500 index and Vanguard Money Market Reserves-Prime Portfolio, a top money fund, from September 1976, the month the Vanguard index fund were started, to March 1988 to compare the results. The way to implement the periodic strategies and the simulation results are listed in Table 3-1.

Table 3-1 Simulation results for five periodic strategies

Assumptions

In each case, \$28,000 were invested in nearly 12 years from September 1976 to March 1988.

The investment proceeds were split into a \$200 monthly contribution between Vanguard Index Trust-6000 Portfolio and Vanguard Money Market Reserves-Prime Portfolio.

Periodic Strategies	Implementation Tactics	Investment Fund in Total	Average Cost Per Share	Portfolio Value	Accumulated Growth Rate
Constant share purchase	Each month, buying the same number of shares in the stock fund and invest the remainder in the money fund	\$28,000	\$19.82	\$57,874	106.7%
Dollar-cost-averaging	Each month, invest \$100 in the stock fund and \$100 in the money fund	\$28,000	\$19.12	\$59,838	113.7%
Constant ratio	Each month, invest \$100 in the stock fund and \$100 in the money fund, whenever the value of our stock fund shares reaches 55% of the total portfolio, shift assets to the money fund to reduce the percentage to 50%. But do the opposite way if the value of the stock fund shares falls to 45% of the portfolio.	\$28,000	\$19.23	\$60,264	115.2%
Variable installments	Start out by investing equal amount in the stock fund and the money fund. Then adjust the contributions to the stock fund when the fund's current share price is higher or lower than your average cost, namely invest less when the current share price is higher than the average cost while increase the contribution when it is lower. The remainder goes to the money fund.	\$28,000	\$18.75	\$59,344	111.9%
Leveraged variable installments	It is the same concept as Variable installments, however, the increase or decrease of the contribution in each month is enlarged. The greater the leverage you use, the lower the average cost per share and also the risk will be.	\$28,000	\$18.66	\$59,902	113.9%

From Table 3-1, it's obvious that no matter which strategy investor chooses, the accumulated growth rate exceeds 100%, indicating that periodic strategies are feasible and effective investment strategy. However, considering the argument raised by academic literatures discussed in Chapter 2 that LS or BH strategy could outperform DCA (or even other periodic strategies) in terms of return and risk. This study examines the BH strategy by S&P 500 index within the same period. If investor puts all his money at the beginning of September 1, 1976, the accumulated growth rate on March 31, 1988 will be 148.97%, around 30% higher than that of any periodic strategies. But if we decompose the invest return within this period, we could find out it's a tough test on investor's patience to wait for the realization of the profit. Figure 3-2 presents the historical chart of S&P 500 index within the same period.

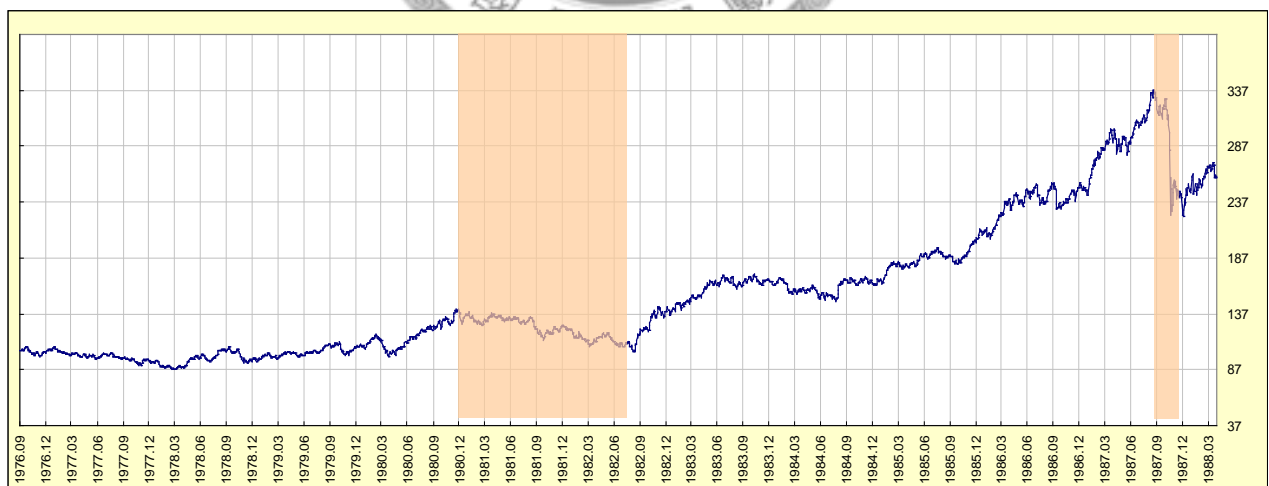


Figure 3-2 Historical Chart of S&P 500 from 1976/9/1 ~ 1988/3/31

First, from September 1, 1976 to August 31, 1979, what investor earns is negative

return, around -2%, within these three years. Then their investment finally starts to show some bright side in proceeding year but what follows is the longest bear market in the simulation period. The bear market starts from November of 1980 to August of 1982 and the index has fallen by 27.11% from its peak (wider shaded area in Figure 3-2). That means up to now investors has endured almost six years of bear market and the portfolio value is even less than the initial value. Only the person who is able to tolerate the loss lasting for 6 six years can have the chance to earn great profit in following 5-years bull market. However, the unpredictable market crash in October of 1987 will make the value of the investment portfolio drop by 33.52% in a couple of days (thinner shaded area in Figure 3-2). As mentioned in previous paragraph, investors hardly could know the direction that market will go to and for anyone who put money in the market at once, it's really a tough test to conquer the fear when market is falling or the greed when being in the bull market to earn excess return in the end.

Second, during the period from September of 1976 to August of 1982, it is a long-time bear market that investors need to put up with. However, the interest rate for 3-month U.S. Treasury Bill in this period is around 4.3% ~ 15.5%. The historical 3-month T-bill interest rate is presented in Figure 3-3.



Figure 3-3 Interest rate for 3-month U.S. Treasury Bill

Suppose the average annual interest rate is around 8%, then compound 6 years will earn 58% return. This is the opportunity cost for investors who put money in the market at once will sacrifice. Given such a high opportunity cost, any individuals will lose patience to wait for their investment to make profit and will be easily dominated by the idea that term deposit is better than making investment.

Last, investors need to consider the issue of volatility, namely to which degree of risk investors could accept related to their investment. In previous simulation, in the former 6 years (September of 1976 to August of 1982), the largest accumulated amount of decrease is -27.11% and the bear market lasted for 21 months. Even in the latter bull market, stock price took a big dive in last three months, reached -33.52%. It is unavoidable difficulties that investors need to overcome.

From previous analysis, it's obvious that investor's psychology plays an important role to achieve successful investment result and it is also the root of the investment dilemma. From behavioral finance point of view, investors make decisions based on experiences, or even intuitions instead of rational analysis. Therefore, cognitive bias occurs and in terms of investment, slow reaction or overreaction will lead to inappropriate decisions that against investor's own interest. A disciplined strategy is useful to overcome this kind of situation. Though LS or BH strategy might earn much greater profit, periodic strategies help investors to conquer the above-mentioned difficulties in systematic way. The five periodic strategies that Mr. Willis described in the special report actually share some common characteristics. It filters out the noises from the market and gives the investor a disciplined approach to buy. The strategies of buying is to encourage investor to buy more share when prices are low and fewer when prices are high, thereby lowering the average cost and also reducing the investment risk. It works better when market is choppy. Meanwhile, with clear rules, investor could know the time and amount to buy, which further reducing the anxiety or stress from investment. It is helpful to prevent from leaving the market when experiencing long-time bear market since investors might lose opportunity to accumulate shares at lower cost.

Among the five periodic strategic, DCA is the main strategy when investors consider

to invest in mutual fund nowadays. The other strategies are the variations or amendments on DCA's concept or mechanism in order to improve the return (such as constant ratio strategy) or to further lower risks (such as Variable installments strategy and Leveraged variable installments strategy). Given their superiority in either improve rerun or reduce risk, these methods should be widely accepted by investors after decades of development in investment strategy. However, only the DCA strategy became widely-adopted tool and has been regarded as standard strategy by banks or securities investment trust/consulting enterprises. According to the statistics conducted by SITCA in this decade, there are 240 thousand to 650 thousand individuals investing in mutual funds through DCA strategy and the investment amount every month is around NTD 1.1 billion to 4 billion. The statistics is graphed in Figure 3-4 to see the trend clearly. Meanwhile, we should notice that the statistics only comes from the declaration by securities investment trust/consulting enterprises, meaning the figure will be even larger if the trust fund from banks is included. It just tells us the ubiquitous of DCA strategy in mutual fund investment.

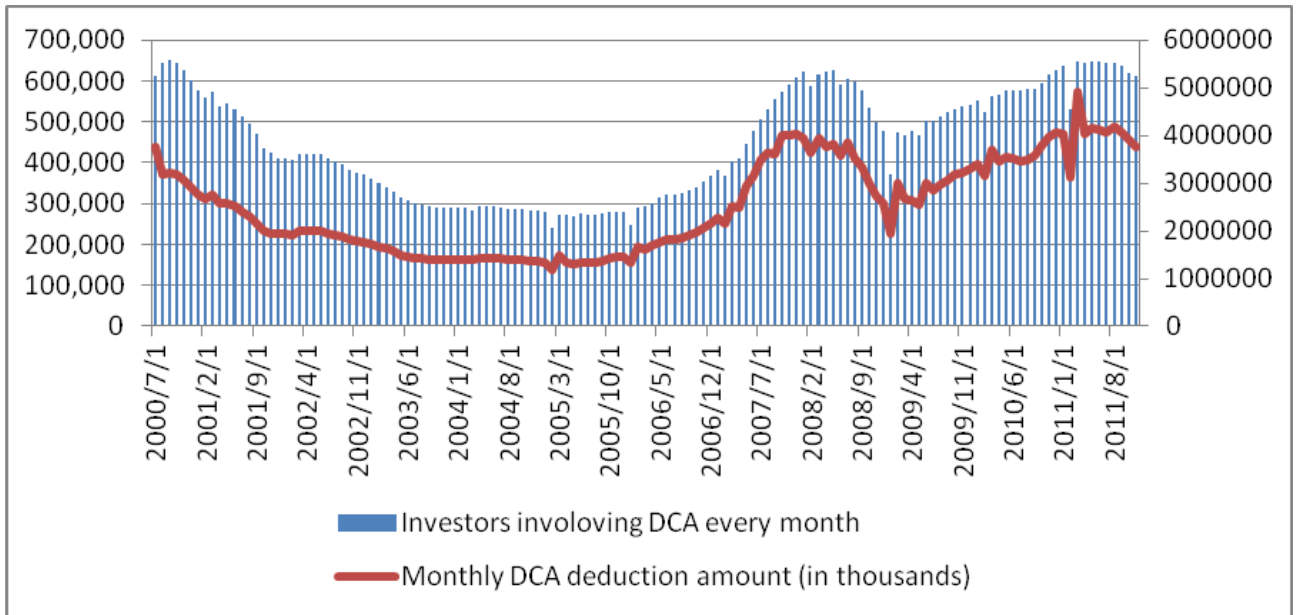


Figure 3-4 The statistics of investors involving DCA strategy and the amount deduction every month from 2000/7/1 to 2011/11/30

But from the simulation result of the five periodic strategies, DCA doesn't provide the most superior return, nor could it reduce the risk to the lowest degree. Then the reason why DCA is so popular may attribute to its simplicity in use and understand, combined with the fantasy of compound interest over the long run, which makes investors believe investing is a simple task. Given that, whether DCA is any efficient investment strategy or any defects may exist in its mechanism seems to be not important at all. The misconception about DCA's effectiveness and profitability would be apparent from the simulation result of DCA strategy in S&P 500, TWSI and one of the domestic stock mutual funds in next section.

3.2 Misconceptions about DCA strategy – by simulating DCA strategy on Taiwan

Weighted Stock Index and Capital Marathon Fund

To discuss the misconceptions about current DCA strategy, this study follows the simulation example in last section to utilize DCA strategy to invest in S&P 500 index.

USD 100 is invested monthly and the investment starts from September 1, 1976 to March 31, 1988. The only difference with that conducted in Money magazine is that the investment in risk-free fund, namely the money-market fund, is not included.

Figure 3-5 depicts the simulation result.

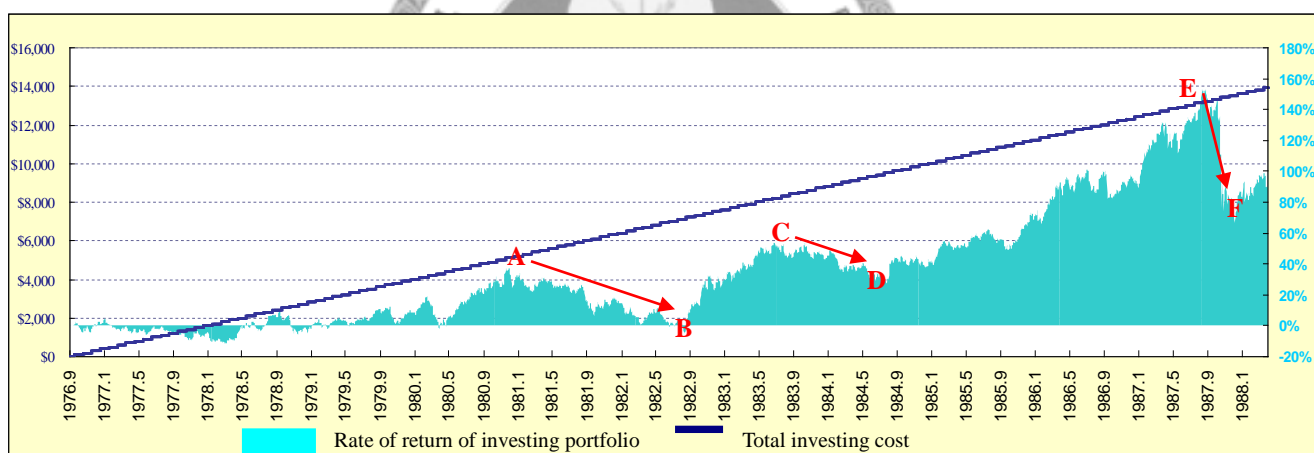


Figure 3-5 Simulation of DCA in S&P 500 Index from 1976/9/1 ~ 1988/3/31

The solid line represents the total cost of DCA investment. It clearly reveals that with the investment position accumulated over time, the investment as a whole will behave like LS investment even though investors buy fixed amount on a regular schedule to average the risk from the beginning. The whole investment will suffer losses from market volatility (for example from Point A to Point B, Point C to Point D, and Point E to Point F).

E to Point F respectively) as what LS strategy will face. This will definitely influence investor's faith or attitude toward DCA investment. The simulation result tells an important concept, stop gain at appropriate time is crucial to prevent the ever accumulated capital gain from disappearing. However, to which degree investors should set the stop-gain point for their investment portfolio is another question worth of consideration and Chapter 4 will further discuss

As literatures indicate that DCA's disciplined rules help investors to solve the problem of market timing and also reduces the risk of investing all the money in the market at once. But DCA doesn't provide a perfect strategy for investors to earn profit from the market. What investors perceived from propaganda provided by banks or other financial institute about the expected return of DCA strategy is totally different with what investors really could earn. Normally, utilizing DCA strategy to invest in mutual fund is advocated by many financial consultants to be a good way in long-term investment. And to persuade investors, DCA's effect usually would be simplified as "invest a fixed amount every month", "at certain expected rate of return", "steadily invest in how many years", and "the expected amount of return could be achieved."

This is what the most common information that investors will receive from financial consultants but this study wants to question its validity in terms of investment result.

The simulation is designed to test the following statement : If investing NTD 16,865

every month at expected annual rate of return of 8%, after 20 years investors could accumulate NTD 10 million as their retirement pension. Table 3-6 illustrates the assumption and simulation result. Since there is no mutual fund being established for 25 years, TWSI is utilized as the investment target and the simulation starts from 5 different dates to test whether the assumption could be achieved simply by utilizing DCA strategy in TWSI.

Table 3-6 The discrepancy of expected return and actual return of DCA strategy

Assumption							
Investing target	Deduction amount every month	Total investing cost	Expected annualized rate of return	Expected terminal wealth			
TWSI	16,865	4,047,600	8%	10,000,000			
Simulation result							
Starting date	Ending date	Investing duration	Investing profit	Net value in the end	Discrepancy with expected wealth	Accumulated rate of return	Annualized rate of return
1986/1/1	2005/12/31	20	2,294,895	6,342,495	(3,657,505)	56.7%	4.29%
1987/1/1	2006/12/31	20	2,077,018	6,124,618	(3,875,382)	51.3%	3.97%
1988/1/1	2007/12/31	20	1,874,732	5,922,332	(4,077,668)	46.3%	3.66%
1989/1/1	2008/12/31	20	(910,346)	3,137,254	(6,862,746)	-22.5%	-2.68%
1990/1/1	2009/12/31	20	1,617,317	5,664,917	(4,335,083)	40.0%	3.24%

The result shows in terms of return, with 20-years DCA investing in TWSI, investors only get annualized return around 3% to 4% and the difference with expected annualized return is more than doubled. The interest rate gap seems to be not significant, but it turns out to be a huge shortfall amounted to NTD 3 to 4 million in capital with respect to terminal wealth. Investors may face worse condition if his investment started from the beginning of 1989, which even made a loss of NTD 910 thousands in the principal after 20 years.

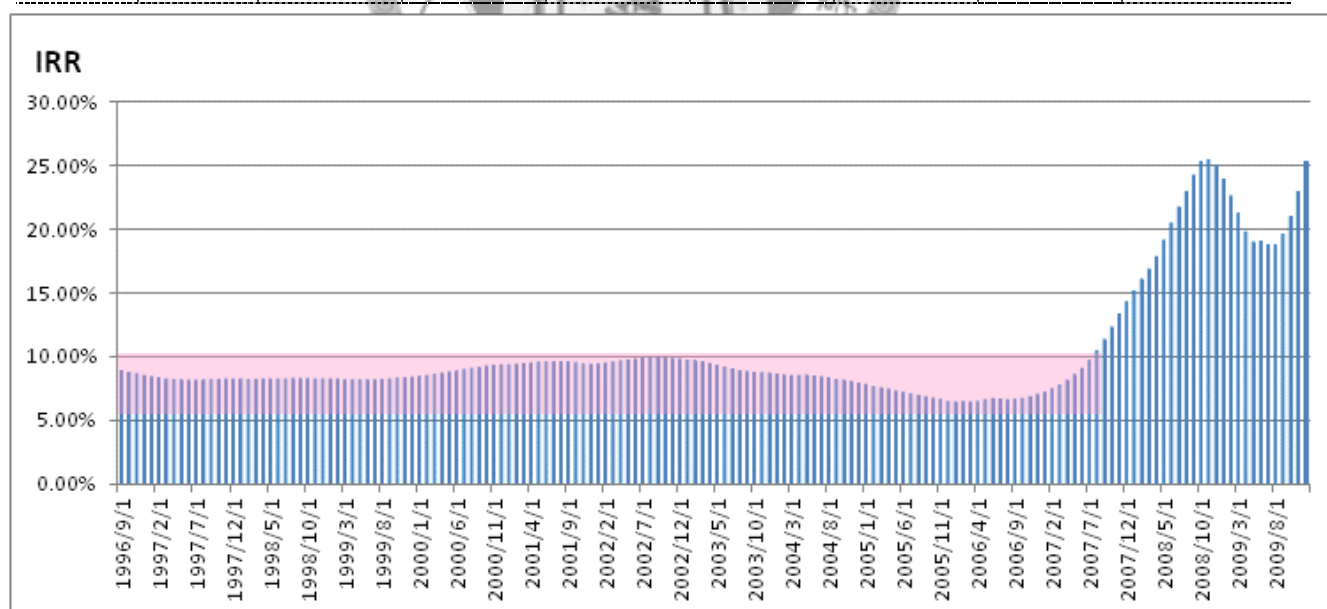
Instead of TWSI, this study utilizes Capital Marathon Fund to illustrate the phenomenon that investors will face when utilizing DCA strategy. Capital Marathon Fund is one of the domestic stock funds with largest asset scale (amounting to NTD 10.9 billion at the end of Nov. 31, 2011) and highest net value (once reached NTD 98.13 per share on October 21, 2007). This fund was established on August 20, 1996 with net value at NTD 10. As of November 29 of 2010, the net value of the fund is NTD 71.95 and annualized rate of return (IRR) of 14.83%. Then base on the IRR figure to estimate the terminal wealth that investors could get theoretically. This kind of logic is frequently adopted by financial consultant when they recommend DCA strategy. Table 3-7 represents the difference between the theoretical return and actual return from simulation on historical data. Meanwhile Figure 3-8 illustrates the variations of the IRR of different investing durations from 12 to 171 months (171

months implies starting investment when the fund is established).

**Table 3-7 Difference between the theoretical return and actual return when DCA
in Capital Marathon Fund**

Assumption : Suppose deduction amount is NTD10,000 on the 16th day of every month

Starting date	Ending date	Investing duration (years)	Investing Capital	Net value in the end (X)	Profit or loss	Annual-ized rate of return	Expected wealth (Y)	Differences (X-Y)
1996/11/30	2010/11/30	14	1,680,000	3,156,221	1,476,221	8.57%	5,630,394	2,474,173
1997/11/30	2010/11/30	13	1,560,000	2,732,361	1,172,361	8.27%	4,746,522	2,014,161
1998/11/30	2010/11/30	12	1,440,000	2,411,160	971,169	8.29%	3,983,779	1,572,610
1999/11/30	2010/11/30	11	1,320,000	2,128,540	808,540	8.43%	3,325,566	1,197,026
2000/11/30	2010/11/30	10	1,200,000	1,943,670	743,670	9.39%	2,757,556	813,866



**Figure3-8 Distribution graph of the annualized rate of return for Capital Marathon
Fund with investing duration from 12 to 171 months**

From the variation trend, it is clear that as long as the investing duration is over 40

months (around 3.5 years), the IRR is around 6%~ 10%, rather than the expected rate of return of 14.83%. The simulation has revealed that most investors who just follow DCA strategy to invest in mutual funds over the long run often cannot earn the wealth as what financial consultant claims. It's a misconception to regard DCA as a "strategy for lazy person." There is no simple way to make profit and DCA strategy can't be regarded as catholicon for investment. Though DCA provides investors a disciplined method to lower risk and reduce the feeling of regret or responsibility, its mechanism actually need extra adjustment to ensure the ultimate goal, to make profit, to be achieved. The shortcomings of DCA's mechanism is discussed in next section.

3.3 Analysis of the embedded pitfalls of current DCA mechanism

Beyond the issue of investor's psychology, the endurance of volatility, and the misconception about investment or investment strategy, there should be other barriers that affect investor's decision making and also influence the investment result existing in current DCA mechanism. Based on the simulation result, this study generalizes four perspectives regarding the embedded pitfalls of current DCA mechanism.

A. Investing life is limited for individual investor

Most people start investing after having their own jobs or careers and the motivation for the investing may come from saving for next generation or for the retirement life.

Therefore, the length of investing life is literally limited for individuals. Hence, the attitude and strategy toward investing should be very different between individuals and corporations. Only the corporations could buy in stock and hold it without time constraints to wait for the positive return, which means they could “Buy” and “Hold infinitely”. However, most individuals will hope to accumulate enough capital to satisfy the expected purposes within their limited investing life. Given this consideration, buy and hold strategy is not an appropriate method to achieve the goal for individuals. What investors need is a strategy that they could utilize current DCA mechanism to implement and to make profit within limited investing life.

B. Limited capital for investment

It's undeniable that capital is the fundamental element for any investment. And again, with the same feature as investing life, capital is limited. What differentiate these two elements is that the length of investing life is roughly the same for every investor whereas the amount of the capital available for investing diverges greatly among individuals. However, the amount of the capital is an irrelevant issue for the outcome of an investment, the awareness of limited capital is in fact the key to the success of investment. Therefore, how to control the limited capital is highly related to the effectiveness of an investment strategy. The SITCA's survey in 2009 also proves the importance of controlling the limited capital. The survey interviewed 728 investors

practicing DCA strategy and 42.9% of the interviewees pointed out that they will cease their DCA investment when they “have no money.” The investing doctrine says “Be fearful when others are greedy, and be greedy when others are fearful” (Warren Buffett). What it implies is actually a challenge on investor’s psychology and also the ability of choosing investment strategy as well as controlling the limited capital. How could investors be greedy when others are fearful? Available capital to keep buying in and feasible strategy to implement are indispensable factors to fulfill the requirement, or it is just a slogan.

This study still uses historical data from TWSI to see the importance of capital controlling. Suppose an investor started to invest NTD 10,000 on TWSI via DCA strategy from November 30, 1990. The deduction date is set on the 16th day of every month. After 20 years, the principal is accumulated to NTD 2,400,000 with capital gain of NTD 982,387 and IRR of 3.31%. (Table 3-9)

Table 3-9 DCA \$10,000 every month in TWSI from 1990/11/30 to 2010/11/30

Starting Date	Ending Date	Investing Duration	Total Cost	Net Profit	IRR	Maximum Loss	Maximum Loss in %
1990/11/30	2010/11/30	240months	2,400,000	982,387	3.31%	-653,127	-39.74%

Another simulation, on the other hand, takes limited capital into consideration.

Suppose investor’s maximum capital available for investing is NTD 2,400,000 and the

investing duration is the same as previous example. However, the investor puts NTD 8,000 per month and double his deduction amount when the position losses by 20%.

Table 3-10 presents the investing result.

**Table 3-10 DCA \$8,000 every month in TWSI with double deduction mechanism
from 1990/11/30 to 2010/11/30**

Starting Date	Ending Date	Investing Duration	Total Cost	Profit	IRR	Maximum Loss	Maximum Loss in %
1990/11/30	2010/11/30	240months	2,272,000	1,120,655	3.76%	-535,339	-35.93%

The simulation results from table 3-9 and 3-19 reveal that when taking limited capital into consideration, the investment efficiency could be enhanced. With the same investing period, the investor in later scenario only accumulate principal to NTD 2,272,000, but the profit is better than that of the former scenario. The second simulation also outperforms the first one in terms of IRR. It's because investors reserve some capital in hand and when the market declines, they could have enough capital to buy even more shares which further facilitates to lower the average cost per share. Given that, investors could utilize the limited capital in a more efficient way and hence improve the profitability. Meanwhile, whether the investors could stick to the monthly investing plan is the key to the success of DCA strategy. Taking limited capital into consideration and properly design the monthly deduction plan could prevent investors from ceasing investing plan due to running out of capital available.

It's also a feasible method to practice what the investing doctrine says, "Be greedy when others are fear."

C. Lack of clear instructions or methods to achieve the goal, make profit

Considering the capital constraint and further to adjust the monthly deduction amount only fulfill half of what required by the investing doctrine. We still need other mechanism to make sure that investors could be fear when others are greedy. As we mentioned in previous section, only the corporation could buy in stock and hold it for indefinitely. For individuals, selling is a must step when making investment. All the periodic strategies mentioned so far are stressing the mechanism of buying, but none of them mention about how to sell. Selling implies the concept of stop gain and it could prevent the capital gain that ever accumulated during the investing period from disappearing with market volatility. It's wrong idea to use DCA as long-term investing tool without any management. Figure 3-11 and Figure 3-12 illustrate the difference between the investment with and without stop gain mechanism. Suppose there are two investors A and B. They both invest in TWSI via DCA strategy with monthly deduction of NTD 10,000 from December of 1988 to December of 2008, totaled 240 months. The only difference is Investor A follows what financial consultant will advise to regularly invest money in the fund without considering redemption at appropriate condition. Meanwhile, Investor B also invest in a disciplined way but

equipped with stop gain mechanism with his DCA strategy, namely when his investing portfolio makes 20% profit, the redemption will activate to assure the profit.

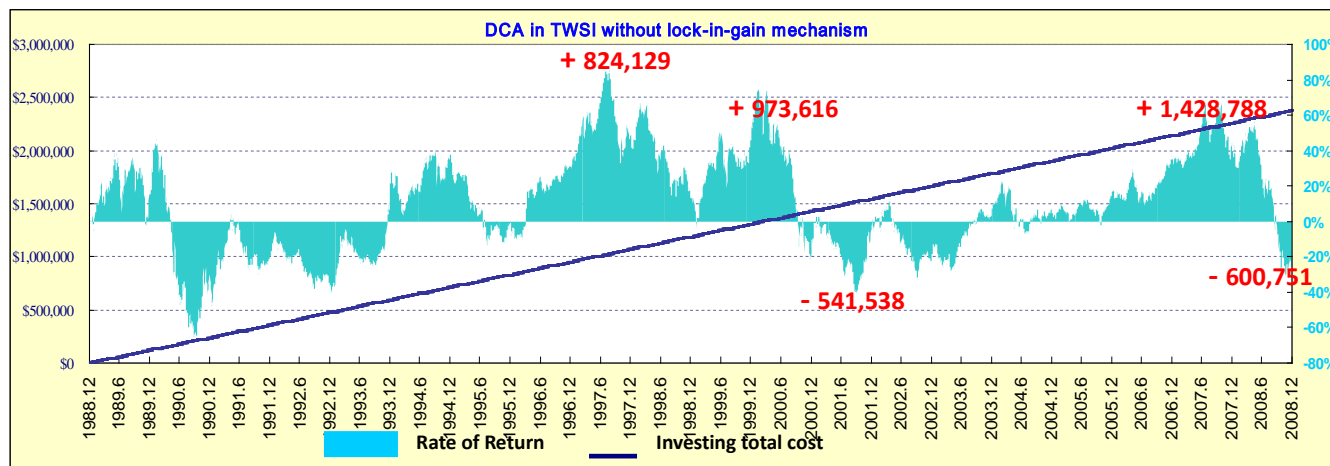


Figure 3-11 DCA in TWSI without stop-gain mechanism

In the investing duration of 240 months, Investor A accumulated principal of NTD 2.4 million. However, the 20-years investing ends up with a loss of NTD 539,785. Table 11 depicts the return variations of the 20-years DCA investing in TWSI. Three unpredictable events occurred in this period attributing to the loss. Asia financial Crisis in 1997 makes the once-accumulated portfolio profit of NTD 824,129 go back to zero. Though the market bounced back in couple of years, the dot-com bubble in 2000 again let the accumulated portfolio profit of TND 973,616 within 11 years became a loss of NTD 541,538. From profit to loss, the stress or regret that investors need to bear will more than doubled. This kind of cycle repeatedly appear, for investors who still stick to the DCA strategy and keep put money in the market will earn greater return in later years, the profit accumulates to TND 1,428,788. But it's

not the happy ending for the investment. The subprime crisis in 2008 again reverses the result from accumulated profit to a loss of NTD 600,751. 20-years investment even erodes investor's principal by NTD 539,784.

It's obvious that the volatility of the portfolio return is very high even with DCA strategy. This is against what we originally expect that DCA could eliminate the problem of market timing and reduce the investing risk. From the solid line of total investing cost in Figure 3-11, we could notice that the effect of eliminating market timing problem which DCA tries to achieve by investing small amount of capital at regular interval will gradually diminish with the accumulation of portfolio position. The NTD 10,000 invested in the 12th month accounts for 1/12 of the whole portfolio whereas the same amount only accounts for 1/240 of the investing portfolio in the 240th month. Therefore, the fixed amount invested every month actually has different degrees of impact on the whole investing position. The effect of the amount invested in the 12th is 20 times larger than that in the 240th months. Given that, the bigger the accumulated position is, the smaller the advantage of diversifying risks that DCA expected to provide will be.

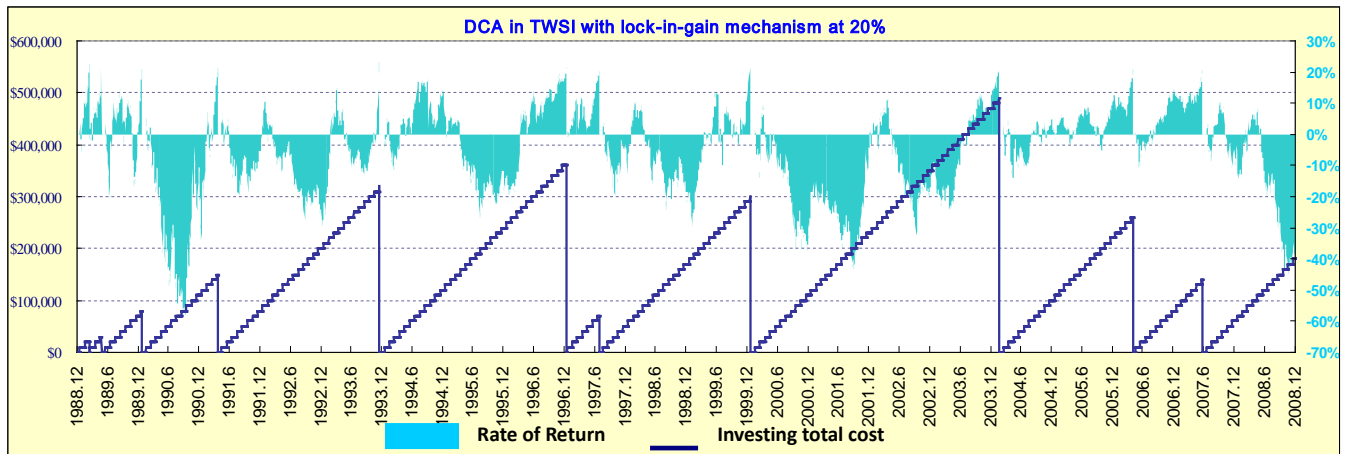


Figure 3-12 DCA in TWSI with stop gain mechanism at 20%

However, if we examine the investing result of Investor B, the 240 months investment makes a profit of NTD 403,723 under the same deduction plan with Investor A. What differentiates the final result is that Investor B utilizes DCA with stop gain mechanism to ensure the profit, prevent it from disappearing again with the market volatility. Within the whole investing period, Investor B captures profit opportunities by 11 times. Table 3-13 presents the redemption detail when meeting the stop gain criteria.

Table 3-13 Redemption detail when meeting the stop gain point at 20%

No.	Starting Date	Ending Date	Investing Duration (months)	Net Profit	Investing Cost	Profit in %	Deduction Times
1	1988/12/31	1989/03/14	2.5	\$4,260	\$20,000	21.30%	2
2	1989/03/14	1989/05/26	2.4	\$6,665	\$30,000	22.22%	3
3	1989/05/26	1990/01/23	7.9	\$18,355	\$80,000	22.94%	8
4	1990/01/23	1991/04/26	15.1	\$33,107	\$150,000	22.07%	15
5	1991/04/26	1993/12/17	31.7	\$69,780	\$320,000	21.81%	32
6	1993/12/17	1997/01/12	36.83	\$76,315	\$360,000	21.20%	36
7	1997/01/12	1997/07/29	6.57	\$13,872	\$70,000	19.82%	7
8	1997/07/29	2000/01/18	29.63	\$61,896	\$300,000	20.63%	30

9	2000/01/18	2004/02/18	49.00	\$100,265	\$490,000	20.46%	49
10	2004/02/18	2006/05/05	26.57	\$55,271	\$260,000	21.26%	26
11	2006/05/05	2007/06/22	13.57	\$28,858	\$140,000	20.61%	14

Maybe it is inappropriate to compare the rate of return between Investor A and B since the whole principal of Investor A amounts to NTD 2,400,000 whereas Investor B accumulates to NTD 490,000 in maximum. It's because when portfolio performance reaches the stop gain criteria, Investor B will redeem the investment Position. But in the simulation, the redemption proceeds is kept as cash rather than invest in the market. Therefore, the maximum capital that Investor B has used to invest within this period is NTD 490,000 instead of NTD 2,400,000. In view of this condition, this study concludes that Investor B utilizes his capital in a more efficient way than Investor A, with maximum capital of NTD 490,000 to earn the profit of NTD 403,723. Meanwhile, the difference of NTD 1,910,000 is actually idled without proper management. By appropriate asset allocation, the overall profit could be even higher.

The simulation results just reveal the importance of stop gain mechanism for achieving investors' goal, to make profit. Of course it doesn't imply only by stop gain mechanism will guarantee to positive return. How to set the criteria is also an important issue and will be discussed in next chapter.

D. Cannot overcome the challenge when bear market is coming

In view of investor's psychology, long market is preferred and a rising market is

where most investors accumulate capital gains. Contrary to the enthusiasm and fever in the bull market, bear market brings fear and desperate. The accumulated profits of the investing position could be diminished in the bear market or even worse, the principal will be eroded. Therefore, except investment specialists who major in short strategy and speculators, most investors won't be happy to see the coming of bear market.

However, bear market always happens unexpectedly and the frequency of its visiting is quite often. Figure 3-14 and Table 3-15 illustrate the frequency of how often the bear market has visited Taiwan stock market in last two decades. If we define bear market appears one time as when the stock index falls by 20% from the peak and bounce back by 10%, then from January of 1990 to December of 2010, bear market has emerged 22 times in an average interval of 11.5 months.



Figure 3-14 Historical chart of TWSI from 1990/1/1 ~ 2010/12/31

* Shaded area represents the visiting of bear market

Table 3-15 Statistics of duration of bear market in Taiwan stock market

How often the bear will come?	Falling times in this period	Average drawdown percentage	Average duration	
11.5 months	22	-33.78%	120	
Historical data of bear market in TWSI				
Rank	Starting	Ending	Drawdown in %	DuratiOn (days)
1	2008/05/19	2008/11/20	-56.00%	185
2	2000/02/17	2000/12/27	-54.77%	314
3	1990/02/10	1990/05/25	-50.81%	104
4	1990/08/01	1990/08/24	-45.67%	23
5	1990/06/02	1990/07/05	-42.41%	33
6	1992/02/06	1993/01/07	-41.84%	336
7	2002/04/22	2002/10/11	-40.42%	172
8	1994/10/03	1995/08/14	-37.31%	315
9	1991/05/09	1991/10/22	-35.15%	166
10	2001/02/15	2001/07/24	-33.80%	159
11	1990/09/01	1990/10/01	-32.05%	30
12	1997/08/26	1997/10/29	-29.92%	64
13	1991/01/02	1991/01/16	-26.80%	14
14	2001/08/16	2001/10/03	-26.48%	48
15	1998/11/24	1999/02/05	-26.37%	73
16	1993/04/07	1993/09/16	-24.90%	162
17	2007/10/29	2008/01/23	-24.48%	86
18	2004/03/04	2004/08/04	-24.41%	153
19	1998/03/02	1998/06/12	-23.28%	102
20	1990/12/05	1990/12/19	-23.26%	14
21	1998/07/20	1998/09/03	-22.32%	45
22	1999/06/22	1999/08/06	-20.74%	45

It seems that bear market hits Taiwan stock market quite often. But Table 3-16 tells us that Taiwan stock market is definitely not the only exception, the stock markets in BRICKs are also frequently exposed to the attack of bear market.

**Table 3-16 Bear market statistics of stock market in Taiwan and BRICKs from
2000/1/1 to 2010/8/31**

Area	Annualized rate of return	Visiting Frequency	Average Intervals	Maximum Drawdown	Maximum Drawdown Duration (days)	Average drawdown	Average Duration (days)
Taiwan	-0.97%	7	1.5 year	-56.00%	185	-37.2%	160
Brazil	13.47%	8	1.3 year	-59.96%	160	-33.96%	119
Russia	21.69%	16	8 months	-58.23%	30	-30.83%	50
India	11.99%	13	9.8 months	-45.11%	77	-27.77%	82
China	6.37%	10	1.1 year	-45.99%	136	-30.26%	115

If we refer to the performance of Russia Stock market (RTS) from January of 2000 to December of 2010, Russia's stock market has experienced bear attack by 16 times in recent 10 years under the same definition of bear market. The most terrible one occurred in 30 days from September 24 to October 24 of 2008 and the index plummeted by 58.23%. If we redefine the bear market as the stock index falls by 15% from the peak and bounce back by 10%, then the Russia stock market was experiencing bear market attack from May of 2008 to January of 2009 with index dropped by 79.98% in 9 months (Figure 3-17). That means if an unlucky investor happens to invest in Russia stock market before May of 2008 when the market is still rising, his investment will turn out to be a total disaster.

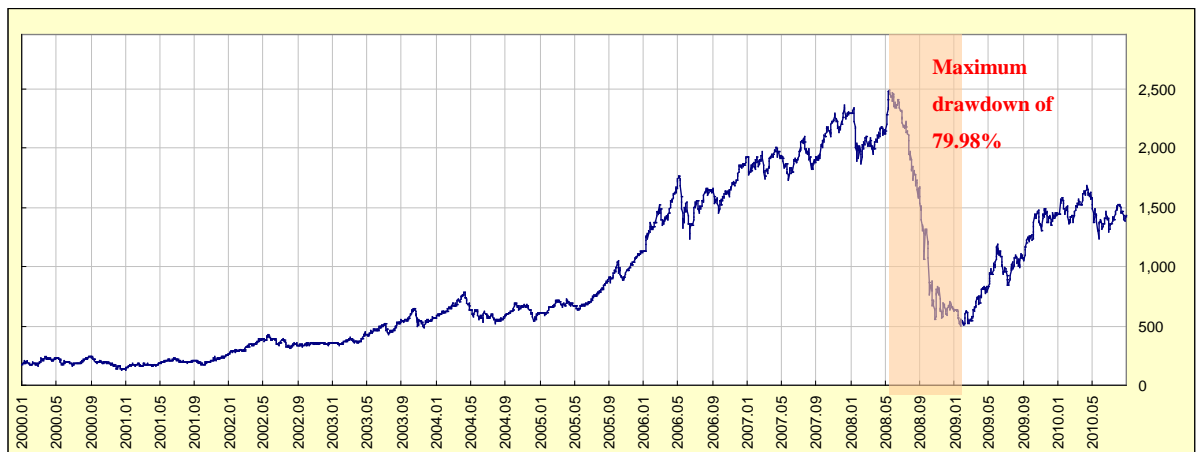
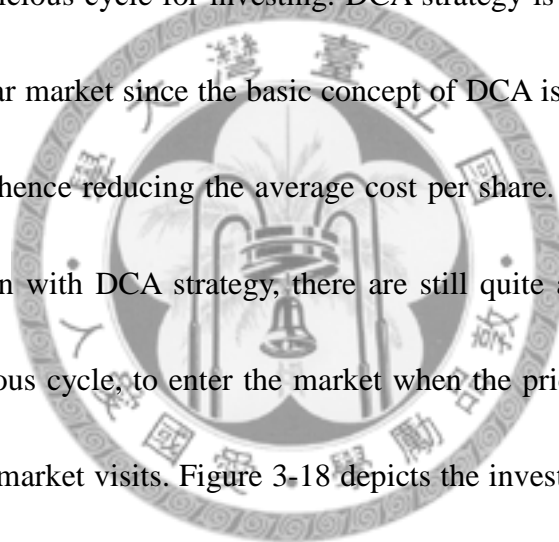


Figure 3-17 Historical chart of Russia stock index (RTS)

The more important issue is how investors will respond toward their investing portfolio in the bear market? There are two types of reactions. Some investors will insist that long-term investment could compensate for the loss that caused during the bear market. But the loss is usually too huge to make up for. Suppose an investor invest in 100,000 in Russia stock market but faces what happened in the Russia market during the period from May of 2008 to January of 2009, the capital he invested will end up with 20,303. Let alone the profit, what investor need is 499% rate of return to earn the principal back. Maybe not so many investors will have the courage to persist on their investment during the bear market, therefore the second reaction that investor will totally lose their faith about investing and sell their investing portfolio at a loss appears. In fact, based on SITCA's survey report in 2009, only 3% of the interviewees indicate they never cease their investing plan in mutual fund whereas 40% of interviewees will stop their investing when the performance of their

investment portfolio reaches the stop-loss point or the investing market plunged. Meanwhile the survey also reveals that the average risk tolerance (in percentage) for interviewees is 19.7% and actually most investors (accounts for 88.2% of the interviewees) can't stand for the loss of their investment portfolio exceeds 30%. From the survey result, we could say the second reaction will be the typical type for most investors. But this kind of investor usually will be tempted by the rising market and enter again. It's a vicious cycle for investing. DCA strategy is supposed to overcome the challenge of bear market since the basic concept of DCA is to buy more when the prices are low and hence reducing the average cost per share. But the statistics from SITCA tells us even with DCA strategy, there are still quite a few investors deeply trapped in this vicious cycle, to enter the market when the price is high and leave at loss when the bear market visits. Figure 3-18 depicts the investing cycle for investors utilizing DCA strategy and reveals that hardly could anyone tolerate the long-time bear market.



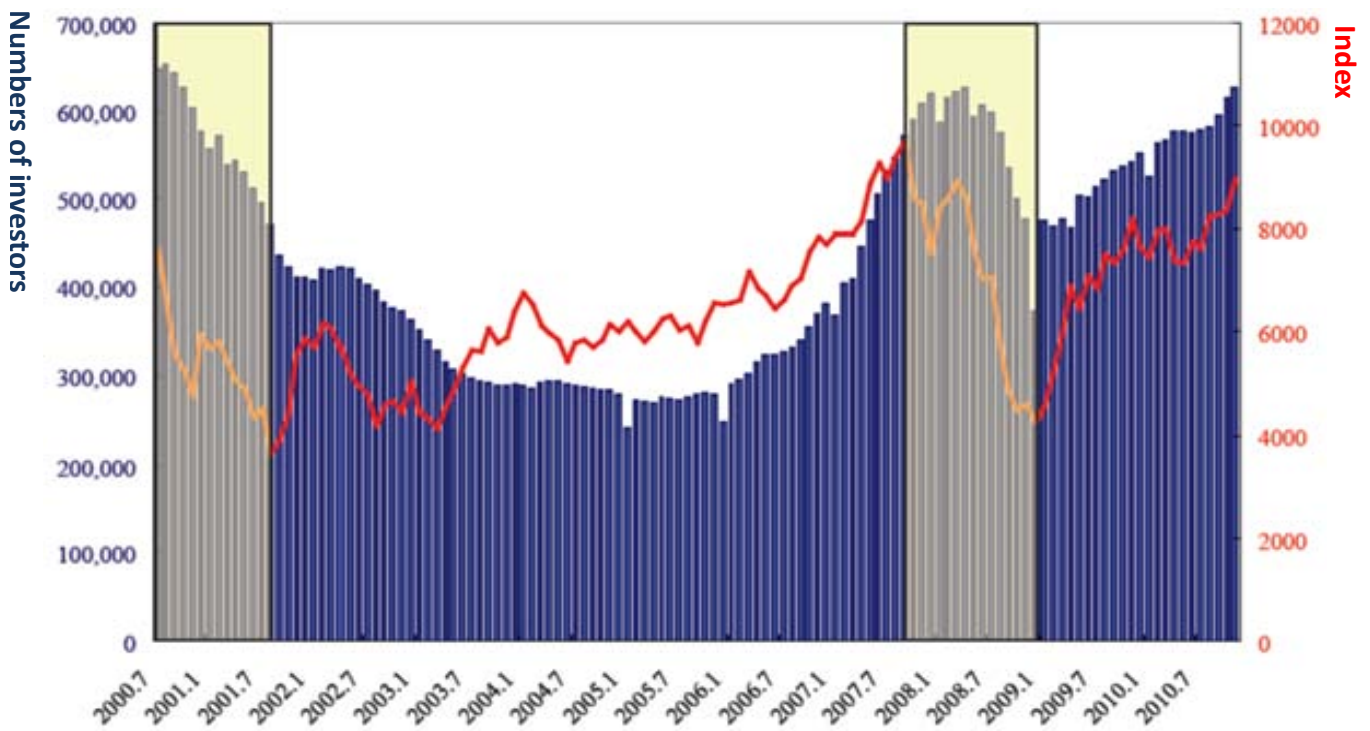


Figure 3-18 Historical charts of TWSEI and the number of investors involving DCA in domestic mutual funds

Source : Fund Strategy Research, available at <http://www.edca.org/>

Before investing, everyone should be aware of the fact that market is volatile and bear market is inevitable. What investors need is to equip with a good investing strategy to well prepared for market crisis. The accumulation in the bear market could be the foundation to earn greater profit when market bounces back.

Ch4. Enhanced DCA Strategy – a practical method to implement DCA strategy

From Chapter 3, this study already illustrates the dilemma that investors need to face when involving in making investment decisions and the misconception for the most-welcomed DCA strategy in terms of mutual fund investment. In this chapter, this study tries to transmute the concepts into effective investing strategies and practical implementation method. In real world, the behavioral pattern of stock market resembles the action of pendulum, swinging back and forth between the two ends. One is when market is apparently in the rising condition and making profit is relatively easy. But it's always hard to predict the future trend and therefore investors will never know when the pendulum will swing to the other end where pessimism is lingering around. As mentioned before, market timing is a difficult problem for individuals and LS strategy could cause high stress or regret feeling when investing at wrong point. Though DCA strategy is designed to solve some investing problems, the investing goal is often missed since it fails to consider the important issue of limited investing life, capital constraint, profit goal and confidence battered by bear market.

The purpose for investors to apply DCA strategy in their investment is simple, to make profit and to accumulate expected wealth. To achieve this goal, the intuitive strategy is to buy and sell. Only buying in and holding without any selling plan can't realize the profit and this study already proves that a long-term holding position accumulated via

DCA strategy will behave like one time endowment. Therefore, the strategy of how to buy and when to sell is very crucial for the profit goal to be fulfilled. Meanwhile, though the market trend is unpredictable, the market performance in the past is still a good reference to build an effective and systematic investing strategy. It's always an applicable way to use the historical data for any specific mutual fund to estimate how investors should respond if he wants to invest in this mutual fund in the future.

To sum up, following logics is the core of building up the effective investing strategy.

First, the strategy should be able to realize the ultimate investing goal, to make profit.

Then, it could provide practical methods to implement the investing concepts. Last, the strategy should be able to be repeatedly utilized in different investing environment.

Since the investing strategy this study will introduce is based on the basic mechanism of current DCA strategy, this study termed it as Enhanced DCA (EDCA) strategy.

EDCA strategy has four core concepts which are symmetrical to the embedded pitfalls of current DCA strategy. The four core concepts includes, to meet the stop gain point in acceptable investing duration, to achieve the investing goal based on limited capital, to buy more shares when the price of investing target is lowering in a planned way, and to make redemption when meet the stop gain point. The four concepts will be explained in following sections.

4.1 Acceptable investing duration and capital constraint consideration

For the issue of limited time and capital constraints, DCA strategy in TWSI is utilized to explain how to make investing decisions under limited time and capital constraints without considering the issue of increasing positions when the market declines. Suppose NTD 5,000 is invested in TWSI at the 16th date of every month and the stop gain point is set to be at 25%. This study tries to analyze the time consumed and the capital invested to reach the stop gain point if the investing simulation randomly starts from January 1 of 1990 to October 30 of 2011 via DCA strategy.

A. Acceptable investing time duration

Figure 4-19 is the scatter diagram of time consuming to meet the 25% stop gain point when starting DCA investment in different index level of Taiwan Stock market from January 1 of 1990 to October 30 of 2011. But the data in the Figure 4-19 only includes 230 months since the simulations start after February 1 of 2009 haven't met the stop gain point until October 30 of 2011.

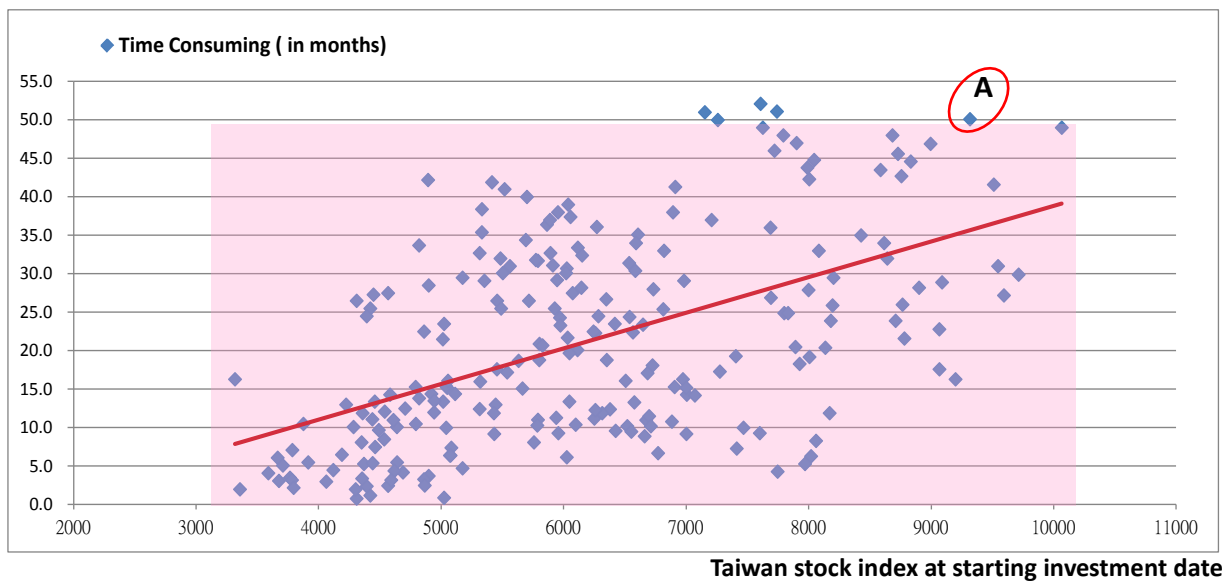


Figure 4-19 Times consuming of DCA in TWSI to meet the stop gain point at 25%

For example, point A represents that investor starts DCA investing on January 16 of 2000 when index is at 9315.43. The DCA investment waits to March 3 of 2004 to meet the stop gain point. Total time consuming for this investment is 50.01 months. If we limit the time consuming for any DCA investment within 48 months, meaning we don't want to wait for realization of the stop gain point of the investment position over 48 months. Then, among the simulation test of starting investment in separate 230 months, from January 1 of 1990 to October 30 of 2011, there are only 7 outliers. That means out of 230 months, only 7 months will make investor's DCA investing wait for over 48 months to meet the stop gain point. In other words, the probability of meeting the stop gain point in 48 months reaches 96.96%. Of course, it is not necessary to limit the investing duration within 48 months, 12, 24 or even longer investing duration is also applicable, only the probability to successful meet the stop gain point will be

different. Table 4-20 presents the successful probability relative to different investing duration limits.

Table 4-20 Probability statistics under different investing duration limits

Investing Duration Limit (in months)	Success Probability
12	75 times / 32.61%
18	110 times / 47.83%
24	137 times / 59.57%
30	170 times / 73.91%
36	196 times / 85.22%
42	210 times / 91.30%
48	223 times / 96.96%
54	230 times / 100%

From Figure 4-19 we could notice that the time consuming to meet the stop gain point seems to have positive relation with the level of index at the time when starting investment. If investor starts DCA in TWSI when index is low, the investing time needed to reach the stop gain point will be shorter and vice versa. But this is just a rough description and it doesn't imply the profit that investors could get will be higher if starting DCA investing when index is low. Meanwhile, table 4-20 also tells that the longer the time consumed, the higher the probability that DCA investment could meet the stop gain point within time constraints. However, it is also a test on investor's

tolerance and faith when longer investing duration is needed.

B. Capital constraints

The scatter diagram in Figure 4-21 depicts the relationship between the amounts of capital needed to meet the 25% stop gain point and index at the time when investors start DCA investment.

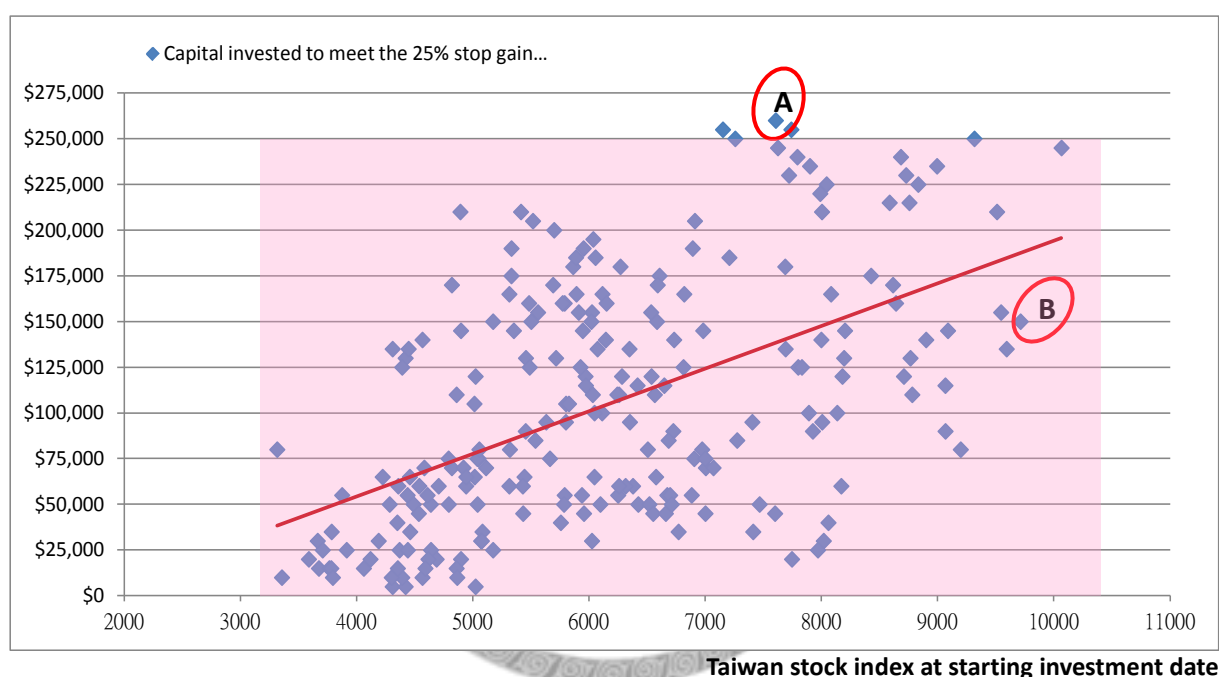


Figure 4-21 Capital consuming of DCA in TWSI to meet the stop gain point at 25%

Any point in the diagram represents how much capital needed to meet the 25% stop gain point at the corresponding index where investor starts their investment. Point A indicates that when investor starts DCA investment on November 16 of 1999, the index level of Taiwan stock market is 7,606.2. When the investment finally meets the 25% stop gain point on March 16 of 2004, the total capital invested is NTD 260,000. However, point B (invest when index at 9,712.45, and investing period is from August

16 of 1997 to January 28 of 2000) only accumulates capital of NTD 15,000 to meet the 25% stop gain point. Suppose an investor's maximum capital available for investing is NTD 250,000, among 230 chances to enter the market, only three entering time will exceed the capital constraint. That means the probability to realize the stop gain goal under the capital constraint of NTD 250,000 is as high as 98.70%. Table 4-22 presents the probability to execute stop gain goal successfully under different capital constraints.

Table 4-22 Probability statistics under different capital constraints

Capital constrains	Success Probability
\$ 50,000	61 times / 26.52%
\$ 100,000	121 times / 52.61%
\$ 150,000	173 times / 75.22%
\$ 200,000	206 times / 89.57%
\$ 250,000	227 times / 98.70%

Positive relationship between the capital invested and index figures seems to exist as presented in Figure 4-21. If investor starts DCA investing when index is low, the amount of capital needed to reach the stop gain point will be relatively less. On the contrary, if starting at high stock index, the capital invested will be higher to meet the stop gain point. However, it's just a rough description about their relationship. If investor wants to enhance the successful probability to meet the stop gain point, much

capital definitely will be needed. That means investors need to weight between the success probability and capital needed, to increase the successful probability under limited capital available, investor might need to lower down the deduction amount every month to respond.

Therefore, the higher the probability to meet the stop gain point under the concept of limited investing duration and capital constraints, the higher the possibility that investors could overcome the market challenges. That also implies there is no need to consider the market condition (in the rising or declining) to determine whether to enter or drop out the market since no one could predict the market trend precisely.

4.2 Increase the investing position and redeem at stop gain point

A. Increase the investing position while bear market is coming

Apparently every investor will look forward to participating in the rising stock market.

However, market is unpredictable and bear market always visits without warnings.

Previous discussion already reveals that most investors will lose faith and sell at a loss

when market plunged. But only for those who have the courage and strategy to buy

more shares in the bear market could earn the profit when the market bounces back.

EDCA is a strategy that improves the DCA deduction mechanism to a more

aggressive and strategic one, from originally fixed amount deduction at regular

interval to double the deduction amount when market is plunged to a certain level.

The aggressive deduction mechanism could accumulate investing position quickly and further lower the average cost than current DCA strategy could achieve. Then, at the time when market recovers, EDCA could make profit more easily. Figure 4-23 depicts the average cost by different investing strategies and EDCA creates more opportunities to make profit.

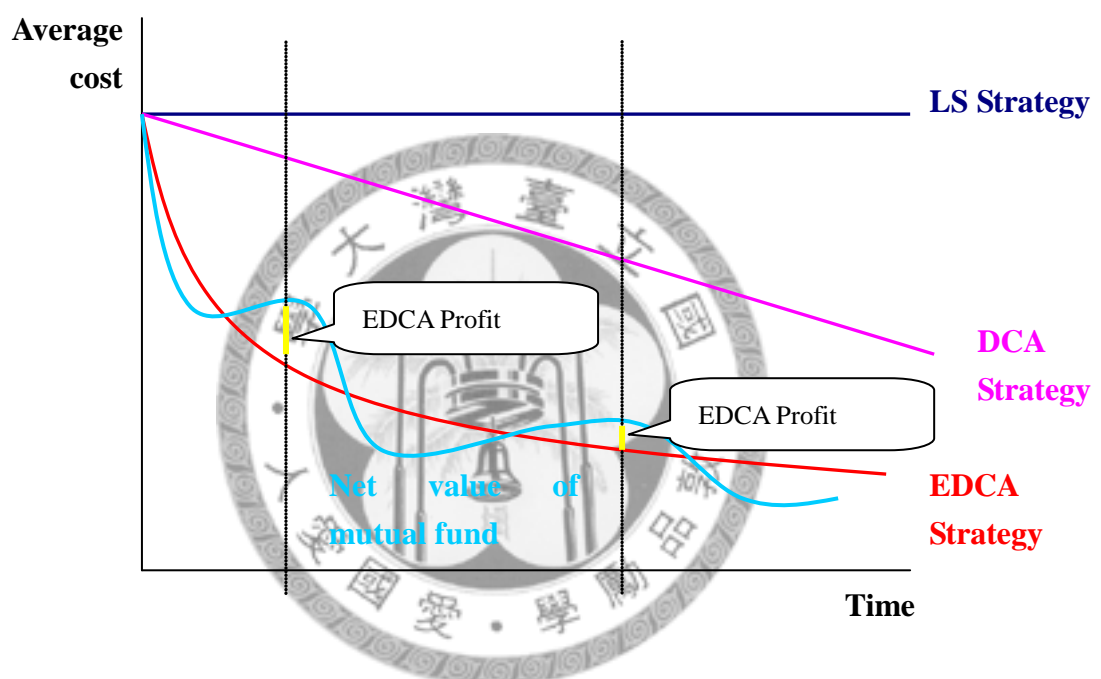


Figure 4-23 Average cost of different investing strategies

But for the concept to increase investing position in the bear market, there are two points worth of emphasizing. First, when is the appropriate condition to increase the portfolio position? Second, how much should investors increase the investing position?

Bear market usually implies the panic of a falling market and most investors hardly could tolerate the loss of their investing portfolio and therefore choose to sell at losses.

This is actually against what the investing doctrine requires, “Be greedy when others are fearful.” Anyone who wants to get excess return will agree that bear market is the best timing to increase the portfolio position since the price is usually relative low. It’s a good chance to accumulate lots of position and prepare for the future when market bounces back. And this study defines bear market as when the market price falls by 20% from its peak. In terms of EDCA strategy, when the unrealized loss of the investing portfolio reaches 20% (namely the average cost per share is higher than NAV by 20%), it is the appropriate time to increase the portfolio position.

As to the second question about the scale of increments on portfolio position, it involves the balance of two issues, whether the increments could effectively lower the average cost and how to well managed the limited capital. This study uses the same condition as raised in Ch 4.1 to discuss how the increments of the portfolio position in the bear market will affect the investing performance and capital control. All condition is the same as the simulation in Ch4.1, only the mechanism of increasing portfolio position is considered this time. The simulation result is presented in Table 4-24, where the maximum cost denotes the highest capital invested among the redemption times which already meet the stop gain points. And the maximum cost efficiency is the ratio of the realized profit and the maximum cost, representing how well investors could utilize the limited capital to create the profit.

Table 4-24 How the increments of the portfolio position in the bear market affect the investing performance and capital control

Stop-gain point	Drawdown percentage	The scale of increments on portfolio position	Times to meet the stop gain point	Maximum capital invested	Realized Profit	Maximum cost efficiency
25%	-20%	50%	7	337,500	338,561	100.31%
25%	-20%	100%	7	430,000	481,897	112.10%
25%	-20%	150%	8	522,500	552,677	105.78%
25%	-20%	200%	9	605,000	641,896	106.10%
25%	-20%	250%	9	695,000	733,530	105.54%
25%	-20%	300%	9	785,000	811,444	103.37%

* Detailed deduction and redemption list at 25% stop gain point is listed in Appendix 1

The capital utilization efficiency is graphed in Figure 4-25, and it reveals that when the unrealized loss of investing portfolio is over 20%, double the deduction amount, namely from NTD 5,000 to NTD 10,000 every month, will be the most appropriate choice. Meaning the capital invested is the lowest while the total profit is relatively high.

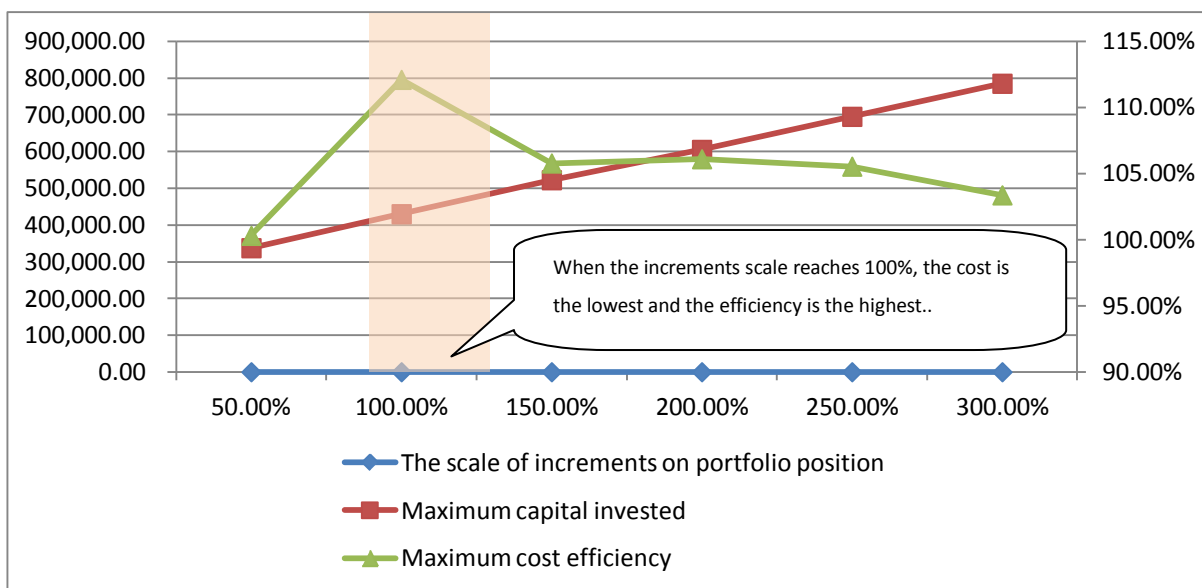


Figure 4-25 The cost efficiency analysis in terms of the scale of increments on portfolio position

B. Redeem when meeting the stop gain point

The basic concept of DCA strategy is to encourage investors to stick to the deduction plan and hence lower the average cost. But it never mentions anything about the selling. Michael E. Edleson pints out the fallacy part of DCA strategy in his writings of “Value Averaging.” He mentions that DCA strategy never consider about selling.

Of course investors hope to sell his portfolio position at high prices but the problem is no one knows when the high point is, or at the time when investors know, it is too late.

If there are no rules or standards for selling that investors could follow, and then the accumulated profit could be damaged, especially most investors sell their portfolio position at relatively low point. This is detrimental to the investing performance. The comments from Mr. Edleson about DCA strategy explains why this study claims that

DCA strategy does not provide clear method to make profits. Buying and selling are very essential to achieve investor's expectation to make profit. Since this study already mentions the technique to buy, the next question goes to how to sell.

To conquer the greedy nature of investor's humanity, EDCA requires investors to set the stop gain point to assure the profit could be realized. The point is what the appropriate stop gain point is? The higher the level, the more difficult the portfolio position could achieve the requirement and may sacrifice other resources such as prolong the investing duration or increase the capital invested. Meanwhile, if the stop gain point is set to be too low, investors may redeem the portfolio position too often and then impact the efficiency of capital utilization and lower the overall rate of return. This study suggest to use the volatility of TWSI as a reference to set the stop gain point, namely using 25% as a roughly reference stop gain point for mutual fund investment.

Volatility represents the price or value variations of stock, index or other investing target within a limited period. When the volatility is higher, it implies the price varies a lot within a certain period and usually indicates the market has higher uncertainty.

The volatility chart of TWSI is presented in Figure 4-26 and the volatility for TWSI is between 23.49% ~ 30.24% from January of 1981 to December of 2010. If the market bubble for the beginning 10 years, from January of 1991 to December of 2010, is

excluded, then the average rolling volatility of TWSI in last two decade is 25.18%.

Period	1981~1990	1991~2000	2001~2010
Annualized volatility	30.24%	27.9%	23.49%
Annualized rate of return	20.29%	0.46%	6.58%

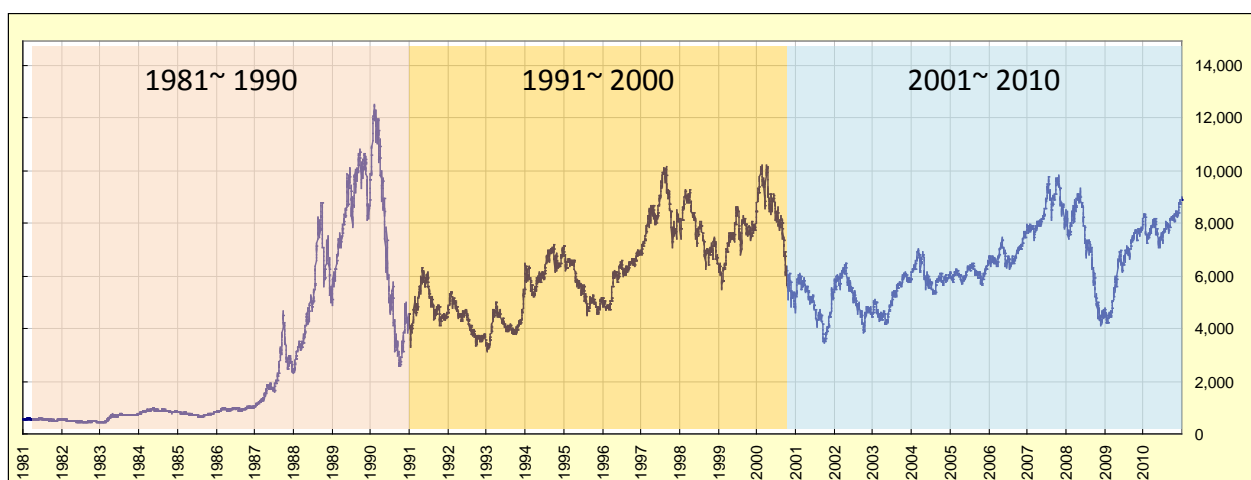
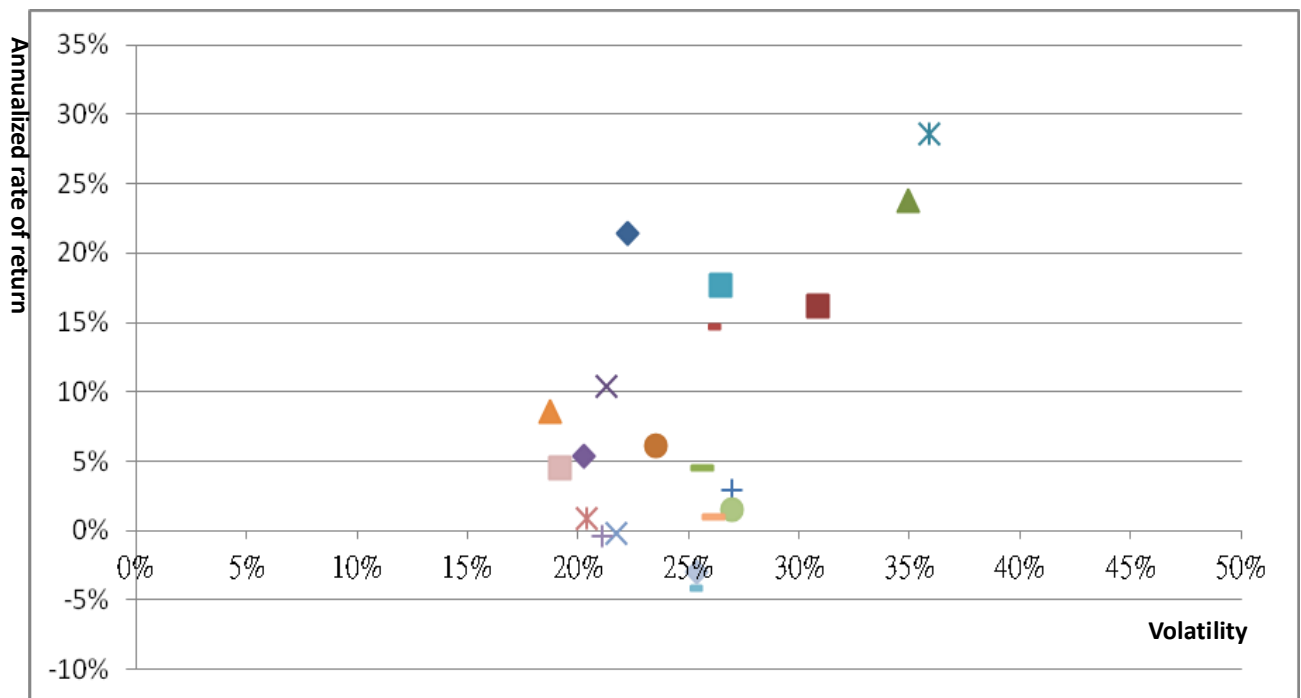


Figure 4-26 Volatility variations of TWSI from 1981 to 2010

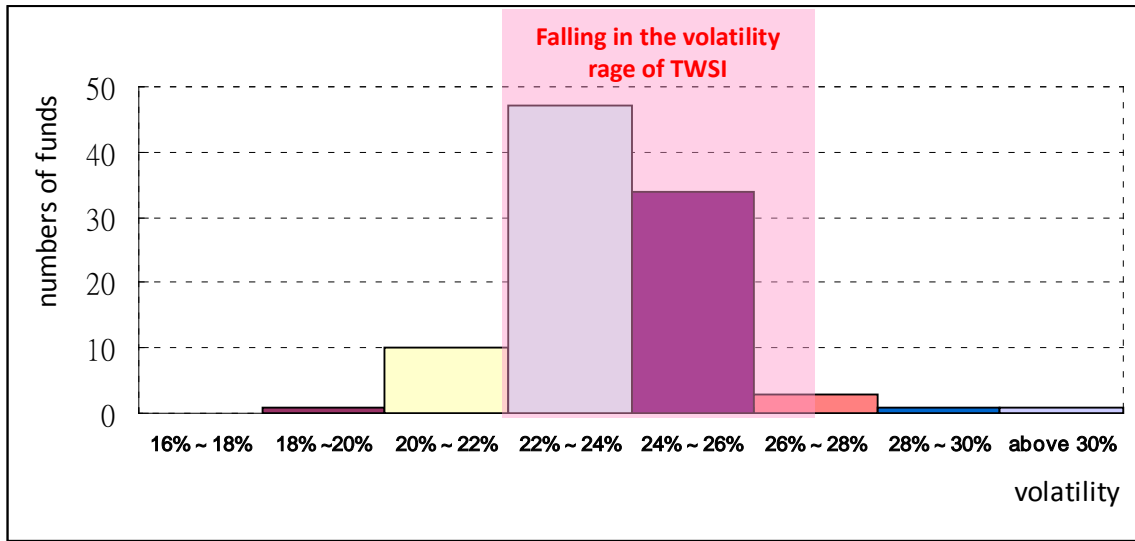
Meanwhile, the scatter diagram in Figure 4-27 is graphed to illustrate the relationship of annualized rate of return and average rolling volatility in the main stock market of different countries during 2001 to 2010. It's obvious that the volatility of the emerging market is around 20.32% to 43.1%, which is higher than that of the developed market, around 17% to 24%.



- ◆ Mexico IPC
- ◆ Brazil Bovespa index
- ▲ Argentina Merval Index
- × Poland MSCI
- × Russia RTS
- Taiwan TWSI
- + China, Shanghai Composite Index
- South Korea, KOSPI
- Hong Kong, Hang Seng Indexes
- ◆ Singapore, Straits Times Index
- India, SENSEX 30 Index
- ▲ Malaysia, KLSE Composite Index
- × USA, S&P 500
- × USA, DOWJONES
- USA, NASDAQ
- + London, FTSE 100 Index
- France CAC 40 Index
- Frankfurt, DAX
- ◆ Japan, Nikkei 225 Index
- Canada, TSX Composite Index

Figure 4-27 Scatter diagram of main stock market in terms of annualized rate of return and average rolling volatility

Then, this study tests the volatility of Taiwan stock funds with establishment date before October of 2001, namely the funds have been established over 10 years (totaled 97 funds). The result shows 85% of the stock funds with volatility falling in the range of 23% to 27%. Figure 4-28 is the distribution graph and illustrations.



Volatility	Numbers	Proportions	Conditions
Below 22%	11	11%	Taiwan stocks mutual funds which has established over 10 years, totaled 97 mutual funds matching the standard.
23% ~ 27%	82	85%	
Above 28%	4	4%	
Total	97	100%	

Figure 4-28 Scatter diagram of the volatility for Taiwan stock mutual funds

* The detailed volatility distribution of 97 mutual funds is graphed in Appendix 2

Another test reveals how similar the volatility could be between different mutual funds with distinct rate of return. This study chooses TWSI, SinoPac Fund, JPM (Taiwan) Global Communication Fund and Allianz Global Investors Taiwan Fund² to make the comparison and the calculation is based on the buy and hold strategy until the September 30, 2011. The basic data of each investing target is listed in Table 4-29 and the comparison chart is presented in Figure 4-30.

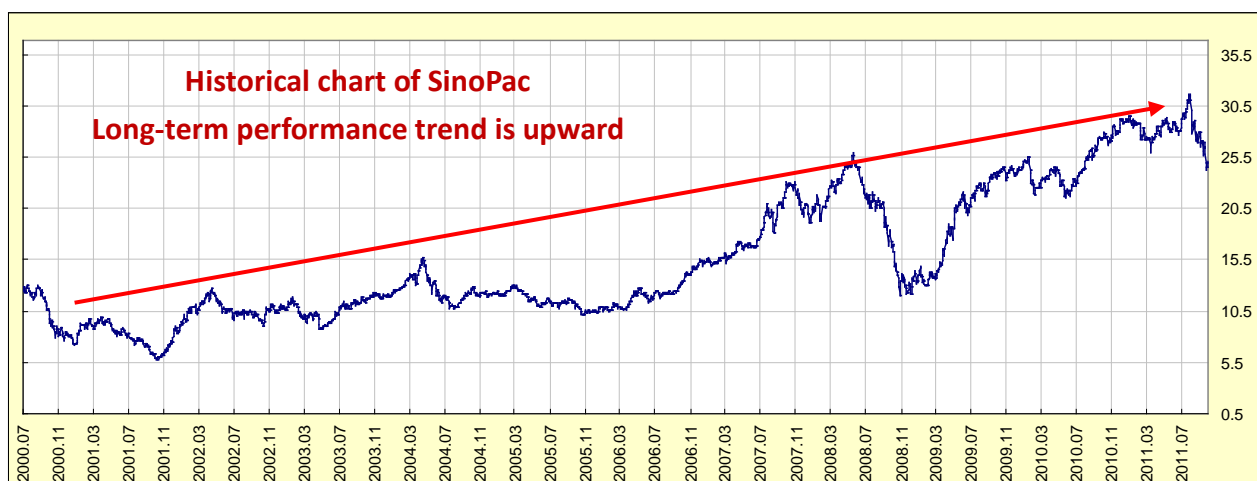
² SinoPac Fund (永豐永豐基金) ; JPM(Taiwan) Global Communication 摩根富林明全球通網基金 ; Allianz Global Investors Taiwan Fund 德盛台灣大壩基金

Table 4-29 Basic data for SinoPac Fund, JPM (Taiwan) Global Communication

Fund, Allianz Global Investors Taiwan Fund

(Invest period from 2000/7/1 ~ 2011/9/30, totaled 11.2 years)

	SinoPac	JPM (Taiwan) Global Communication	Allianz Global Investors Taiwan	TWSI
NAV at beginning	12.9	9.711	9.48	
NAV at end	25.05	3.67	8.44	
Principal at beginning	100,000	100,000	100,000	100,000
Principal at end	194,190	33,370	89,030	87,076
Accumulated rate of return	94.19%	-66.63%	-10.97%	-12.92%
Annualized rate of return	6.08%	-9.30%	-1.03%	-1.22%
Annualized volatility	25.00%	23.09%	24.27%	24.48%
Maximum drawdown (%)	-56.24%	-78.94%	-63.24%	-59.86%



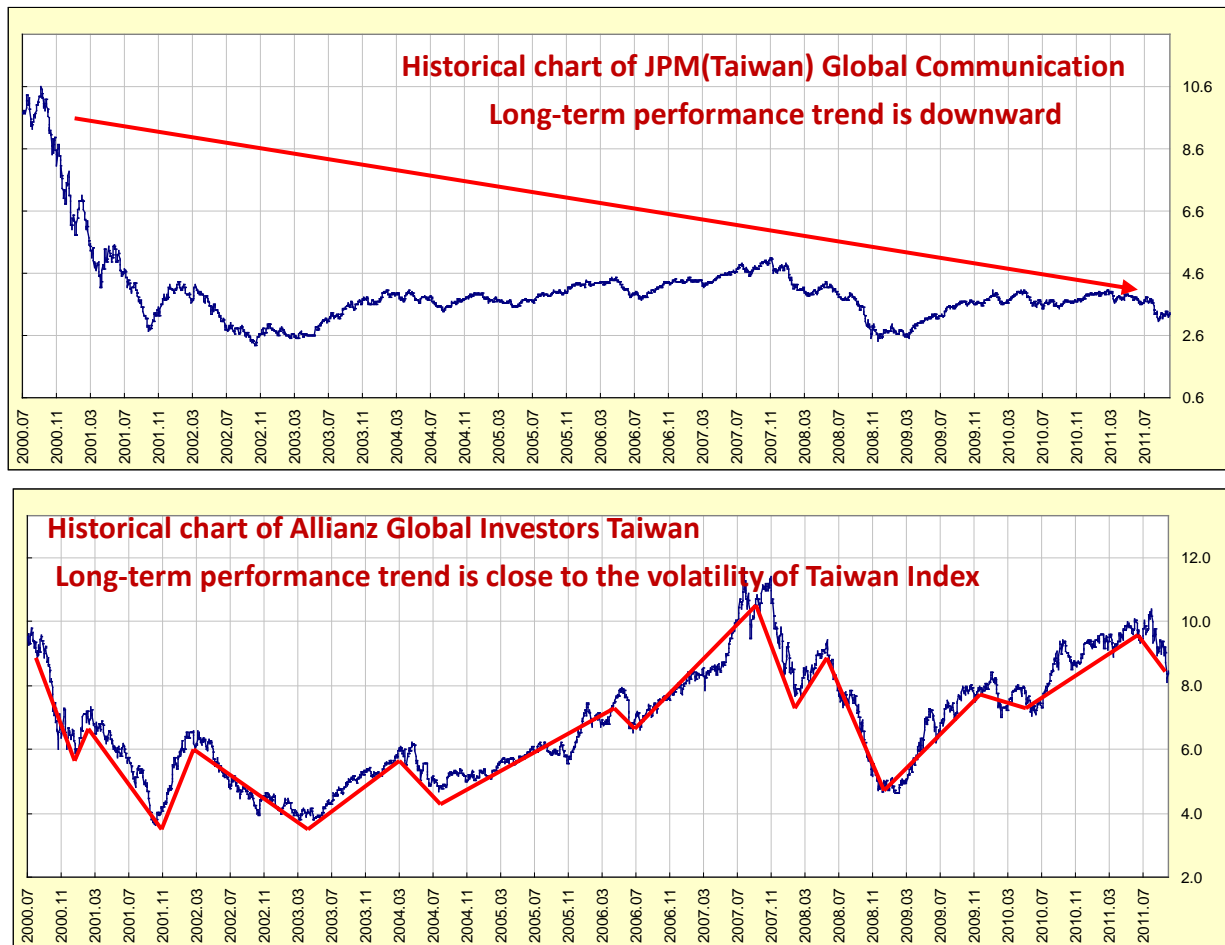


Figure 4-30 Historical performance chart for SinoPac Fund, JPM(Taiwan) Global Communication Fund, Allianz Global Investors Taiwan Fund

To test whether it is an applicable strategy to set the stop gain point at 25%, this study uses the above-mentioned TWSI and other three mutual funds to simulate the investing performance from July1, 2000 to September 30, 2011 via DCA and EDCA strategy and the simulation result is presented in Table 4-31.³

³ SinoPac Fund and Allianz Global Investors Taiwan Fund belongs to equity fund and their investing target are focused on domestic stocks, JPM (Taiwan) Global Communication Fund belongs to international equity fund and its investing target is mainly high-tech stocks. Though the investing area and target are different among the funds that were chosen to make comparison, it is irrelevant to the simulation result. Since the main goal of EDCA is to improve the profitability of current DCA strategy in each mutual fund, rather than to compare the performance among different mutual funds. Therefore, the simulation in this section is to test whether EDCA is an effective strategy to make profit when investing in mutual funds with distinct historical performances.

Table 4-31 Performance comparison among DCA and EDCA in TSWI, SinaPac,

JPM(Taiwan) Global Communication and Allianz Global Investors Taiwan

DCA Strategy						
(with deduction amount at \$10,000 every month, totaled 135 months)						
Investing target	Position in mutual fund	Position in cash	Times of redemption at stop gain point	Total profit	IRR	Maximum drawdown
TWSI	1,350,000	0	0	210,261	2.55%	-36.93%
SinaPac	1,350,000	0	0	1,169,630	10.67%	-35.59%
JPM(Taiwan) Global Communication	1,350,000	0	0	-180,419	-2.52%	-52.17%
Allianz Global Investors Taiwan	1,350,000	0	0	449,901	5.01%	-43.62%
EDCA Strategy						
(with deduction amount \$5,000 and double the deduction to \$10,000 when portfolio losses by 20%, redeem at stop gain point at 25%)						
Investing target	Position in mutual fund	Position in cash	Times of redemption at stop gain point	Total profit	IRR	Maximum drawdown
TWSI	735,000	615,000	3	152,196	13.32%	-42.77%
SinaPac	715,000	635,000	6	177,918	25.33%	-39.64%
JPM(Taiwan) Global Communication	840,000	510,000	1	113,486	4.02%	-48.53%
Allianz Global Investors Taiwan	765,000	585,000	3	179,352	10.14%	-41.17%

* Detailed analysis of the redemption process is listed in Appendix 3

From Table 4-31, it's obvious that EDCA could really help investors to assure the profit, even when investing in mutual fund with historical performance far below the performance of TWSI (JPM(Taiwan) Global Communication). And in terms of IRR, EDCA also outperforms the DCA strategy since the total capital invested by EDCA is far less than that of DCA and EDCA realizes the profit in appropriate time, which prevents accumulated profits from vaporizing in the volatile market.

To sum up, EDCA strategy is an amendment of current DCA strategy. It provides a managed method the helps investors to make profit from mutual fund investment.

Under the constraints of limited investing life and limited capital available for investing, EDCA takes more aggressive deduction mechanism to accumulate portfolio position in the bear market, which helps investors to be prepared for the unexpected market rebound. And EDCA also requires investor to activate redemption when the stop gain point has been met. This step ensures the unrealized profit could be realized and only the realized profit could be counted as what investors really earned.

Meanwhile, disciplined implementation of EDCA strategy is also the key to the success of investment.

Ch5 Empirical simulation to test the EDCA strategy in mutual fund investment

In previous discussion, this study often uses TWSI as an investing target. That's because the performance of the stock index is the benchmark to evaluate the performance of mutual fund. Therefore, to use TWSI as an investing target should be appropriate to explain the difference between DCA and EDCA strategy. Since the four concepts about EDCA strategy has been introduced in previous chapter, this study uses domestic equity fund to run the simulation via DCA and EDCA strategy to see whether EDCA could enhance the rate of return mutual fund investment.

Based on the statistics compiled by SITCA at the end of November of 2011, the top ten mutual funds that have been established at least for ten years and also have the largest DCA investors are Cathay Small & Medium Cap Fund, UPAMC QUALITY GROWTH Fund, Cathay Dragon Fund, Prudential Financial High Growth Fund, JF (Taiwan) Asia Fund, YUANTA EXCELLENCE EQUITY Fund, JF (Taiwan) China Concept Fund, CAPITAL MARATHON Fund, JF (Taiwan) New Technology Fund and CAPITAL HI-TECH FUND⁴ respectively. Next, this study will use the historical data of these ten mutual funds to simulate their performance in last 3, 5, and 10 years via DCA strategy and EDCA strategy to compare the investing results.

⁴ 依序為國泰中小成長基金，統一大滿貫基金，國泰小龍基金，保德信高成長基金，摩根富林明 JF 亞洲基金，元大卓越基金，摩根富林明 JF 龍揚基金，群益馬拉松基金，摩根富林明 JF 新興科技基金，群益創新科技基金。

5.1 The investing performance of DCA strategy in last 3, 5, 10 years

Table 5-32 DCA Strategy - from 2008/10/1-2011/09/30, totaled 36 months

DCA Strategy - from 2008/10/1-2011/09/30, totaled 36 months					
(with deduction amount at \$10,000 every month)					
Investing target	Position in mutual fund	Total profit	IRR	Annualized rate of return	Maximum drawdown
Cathay Small & Medium Cap Fund	360,000	13,296	2.44%	8.08%	-16.08%
UPAMC QUALITY GROWTH Fund	360,000	112,699	19.05%	19.43%	-14.94%
Cathay Dragon Fund	360,000	45,793	8.16%	12.94%	-17.67%
Prudential Financial High Growth Fund	360,000	-9,602	-1.80%	0.91%	-16.18%
JF (Taiwan) Asia Fund	360,000	-14,661	-2.76%	0.04%	-22.36%
YUANTA EXCELLENCE EQUITY Fund	360,000	5,787	1.07%	6.67%	-9.32%
JF (Taiwan) China Concept Fund	360,000	-28,374	-5.55%	-0.09%	-12.13%
CAPITAL MARATHON Fund	360,000	18,537	3.38%	5.62%	-12.54%
JF (Taiwan) New Technology Fund	360,000	-10,966	-2.06%	3.46%	-14.45%
CAPITAL HI-TECH FUND	360,000	54,351	9.62%	10.24%	-17.57%

Table 5-33 DCA Strategy - from 2006/10/1-2011/9/30, totaled 60months

DCA Strategy - from 2006/10/1-2011/9/30, totaled 60months					
(with deduction amount at \$10,000 every month)					
Investing target	Position in mutual fund	Total profit	IRR	Annualized rate of return	Maximum drawdown
Cathay Small & Medium Cap Fund	600,000	9,543	0.63%	2.10%	-45.02%
UPAMC					
QUALITY GROWTH Fund	600,000	210,095	12.16%	12.34%	-38.11%
Cathay Dragon Fund	600,000	80,306	5.05%	4.92%	-43.29%
Prudential					
Financial High Growth Fund	600,000	-8,613	-0.58%	1.18%	-42.62%
JF (Taiwan) Asia Fund	600,000	-58,273	-4.14%	0.62%	-46.88%
YUANTA					
EXCELLENCE EQUITY Fund	600,000	-38,696	-2.71%	-1.99%	-43.97%
JF (Taiwan) China Concept Fund	600,000	-83,657	-6.08%	-0.58%	-38.61%
CAPITAL					
MARATHON Fund	600,000	-13,799	-0.93%	0.73%	-44.23%
JF (Taiwan) New Technology Fund	600,000	-41,686	-2.92%	-1.68%	-43.19%
CAPITAL					
HI-TECH FUND	600,000	37,519	2.43%	2.01%	-52.37%

Table 5-34 DCA Strategy - from 2001/10/1-2011/9/30, totaled 120 months

DCA Strategy - from 2001/10/1-2011/9/30, totaled 120 months					
(with deduction amount at \$10,000 every month)					
Investing target	Position in mutual fund	Total profit	IRR	Annualized rate of return	Maximum drawdown
Cathay Small & Medium Cap Fund	1,200,000	767,827	9.63%	14.58%	-20.17%
UPAMC QUALITY GROWTH Fund	1,200,000	1,539,236	15.87%	19.38%	-15.41%
Cathay Dragon Fund	1,200,000	516,700	7.02%	7.88%	-25.58%
Prudential Financial High Growth Fund	1,200,000	622,211	8.16%	11.09%	-19.20%
JF (Taiwan) Asia Fund	1,200,000	301,869	4.43%	10.11%	-13.87%
YUANTA EXCELLENCE EQUITY Fund	1,200,000	290,355	4.28%	10.69%	-21.78%
JF (Taiwan) China Concept Fund	1,200,000	65,212	1.05%	5.57%	-17.54%
CAPITAL MARATHON Fund	1,200,000	381,544	5.43%	10.34%	-24.84%
JF (Taiwan) New Technology Fund	1,200,000	89,286	1.43%	5.94%	-29.79%
CAPITAL HI-TECH FUND	1,200,000	615,571	8.09%	12.76%	-23.93%

5.2 The investing performance of EDCA strategy in last 3, 5, 10 years

Table 5-35 EDCA Strategy - from 2008/10/1-2011/09/30, totaled 36 months

EDCA Strategy - from 2008/10/1-2011/09/30, totaled 36 months							
(with deduction amount \$5,000 and double the deduction to \$10,000 when portfolio losses by 20%, redeem at stop gain point of 25%)							
Investing target	Position in mutual fund	Position in cash	Redemption times	Total profit	IRR	Annualized rate of return	Maximum drawdown
Cathay Small & Medium Cap Fund	250,000	110,000	2	10,643	8.97%	8.08%	-16.08%
UPAMC QUALITY GROWTH Fund	215,000	145,000	2	38,697	35.51%	19.43%	-14.94%
Cathay Dragon Fund	235,000	125,000	2	15,193	10.75%	12.94%	-17.67%
Prudential Financial High Growth Fund	215,000	145,000	1	14,656	3.42%	0.91%	-16.18%
JF (Taiwan) Asia Fund	230,000	130,000	1	247	0.15%	0.04%	-22.36%
YUANTA EXCELLENCE EQUITY Fund	220,000	140,000	1	6,702	3.71%	6.67%	-9.32%
JF (Taiwan) China Concept Fund	245,000	115,000	1	-250	-0.14%	-0.09%	-12.13%
CAPITAL MARATHON Fund	220,000	140,000	1	12,521	6.60	5.62%	-12.54%

JF (Taiwan) New Technology Fund	230,000	130,000	1	-5110	-2.67%	3.46%	-14.45%
CAPITAL HI-TECH FUND	235,000	125,000	2	33,489	30.09%	10.24%	-17.57%

Table 5-36 EDCA Strategy - from 2006/10/1-2011/09/30, totaled 60 months

EDCA Strategy - from 2006/10/1-2011/09/30, totaled 60 months							
(with deduction amount \$5,000 and double the deduction to \$10,000 when portfolio losses by 20%, redeem at stop gain point of 25%)							
Investing target	Position in mutual fund	Position in cash	Redemption times	Total profit	IRR	Annualized rate of return	Maximum drawdown
Cathay Small & Medium Cap Fund	455,000	145,000	2	62,194	16.74%	2.10%	-44.43%
UPAMC QUALITY GROWTH Fund	430,000	170,000	3	97,484	26.98%	12.34%	-39.62%
Cathay Dragon Fund	415,000	185,000	2	61,909	17.33%	4.92%	-41.42%
Prudential Financial High Growth Fund	435,000	165,000	2	79,639	12.58%	1.18%	-42.62%
JF (Taiwan) Asia Fund	440,000	160,000	2	70,702	12.19%	0.62%	-47.62%
YUANTA EXCELLENCE EQUITY Fund	445,000	155,000	2	84,278	11.85%	-1.99%	-42.31%

JF (Taiwan)								
China Concept Fund	435,000	165,000	1	-23,675	-3.12%	-0.58%	-38.68%	
CAPITAL								
MARATHO N Fund	440,000	160,000	2	83,777	12.28%	0.73%	-42.08%	
JF (Taiwan)								
New Technology Fund	475,000	125,000	2	63,922	14.6%	-1.68%	-41.65%	
CAPITAL								
HI-TECH FUND	445,000	155,000	2	86,973	12.84%	2.01%	-49.13%	

Table 5-37 EDCA Strategy - from 2001/10/1-2011/09/30, totaled 120 months

EDCA Strategy - from 2001/10/1-2011/09/30, totaled 120 months							
(with deduction amount \$5,000 and double the deduction to \$10,000 when portfolio losses by 20%, redeem at stop gain point of 25%)							
Investing target	Position in mutual fund	Position in cash	Redemption times	Total profit	IRR	Annualized rate of return	Maximum drawdown
Cathay Small & Medium Cap Fund	850,000	350,000	6	164,182	26.05%	14.58%	-43.97%
UPAMC QUALITY GROWTH Fund	830,000	370,000	7	192,603	25.25%	19.38%	-40.03%
Cathay Dragon Fund	925,000	275,000	4	189,967	12.87%	7.88%	-41.65%
Prudential Financial High Growth Fund	855,000	345,000	6	191,574	22.32%	11.09%	-41.15%

JF (Taiwan) Asia Fund	780,000	420,000	4	155,913	18.2%	10.11%	-47.45%
YUANTA EXCELLEN CE EQUITY Fund	860,000	340,000	6	192,848	26.205	10.69%	-42.31%
JF (Taiwan) China Concept Fund	815,000	385,000	3	75,503	8.11%	5.57%	-38.68%
CAPITAL MARATHO N Fund	880,000	320,000	6	193,808	20.19%	10.34%	-42.12%
JF (Taiwan) New Technology Fund	915,000	285,000	5	187,221	22.18%	5.94%	-41.65%
CAPITAL HI-TECH FUND	930,000	270,000	7	213,194	23.27%	12.76%	-49.83%

5.3 Comparison between the investing performance of DCA and EDCA strategy in terms of IRR

In this section, this study compares the IRR of DCA and EDCA strategy in different investing duration respectively. When EDCA strategy is utilized, the capital invested in the portfolio in the same duration is actually less than that of DCA strategy and it is because EDCA strategy requires redemption at appropriate time to assure the accumulated profit. Then, the proceeds after redemption are kept as cash in the simulation. Therefore, IRR will be an appropriate standard to evaluate the profitability

of different investing strategies. ⁵

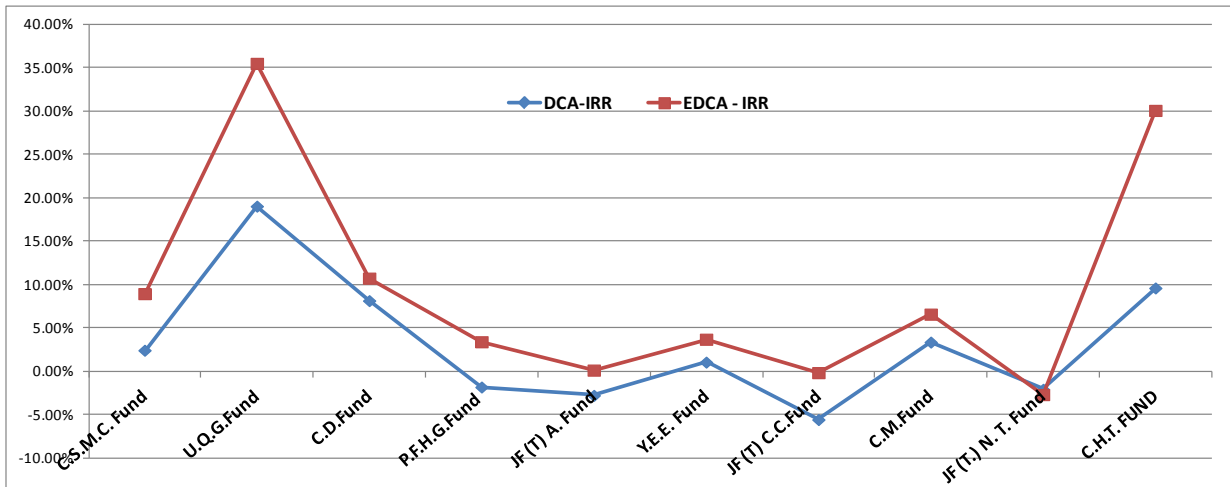


Figure 5-38 36-months investing performance comparison in terms of IRR

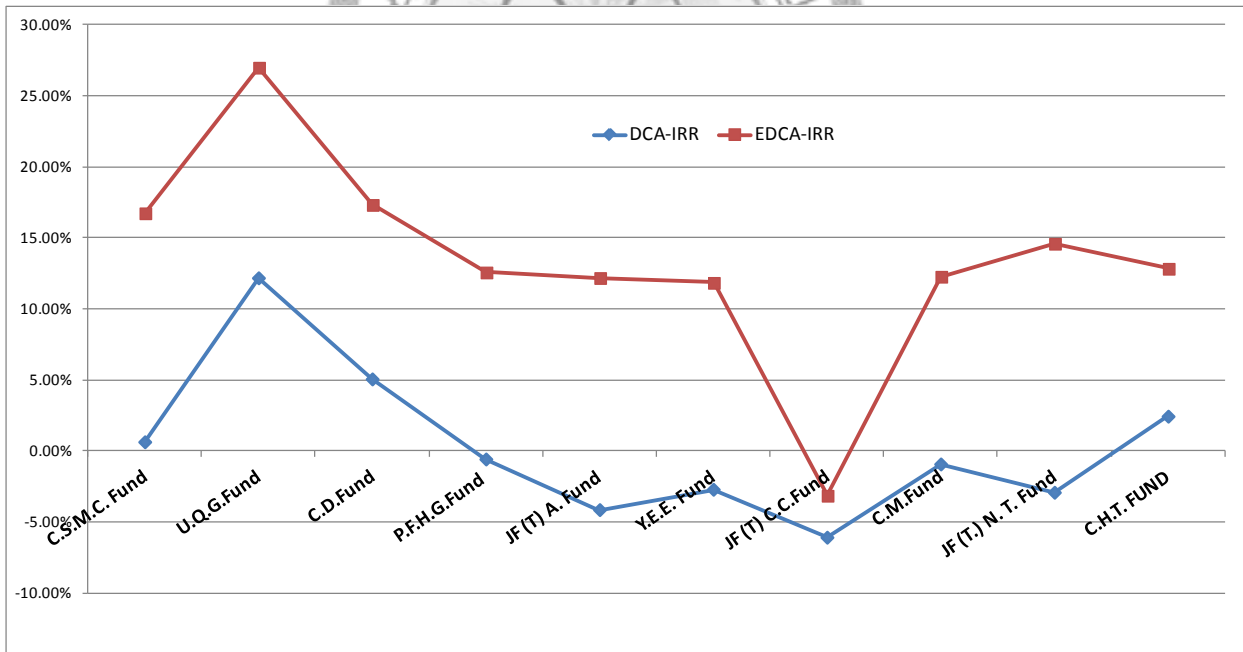


Figure 5-39 60-months investing performance comparison in terms of IRR

⁵ In the comparison figures, this study uses acronyms to represents each mutual fund

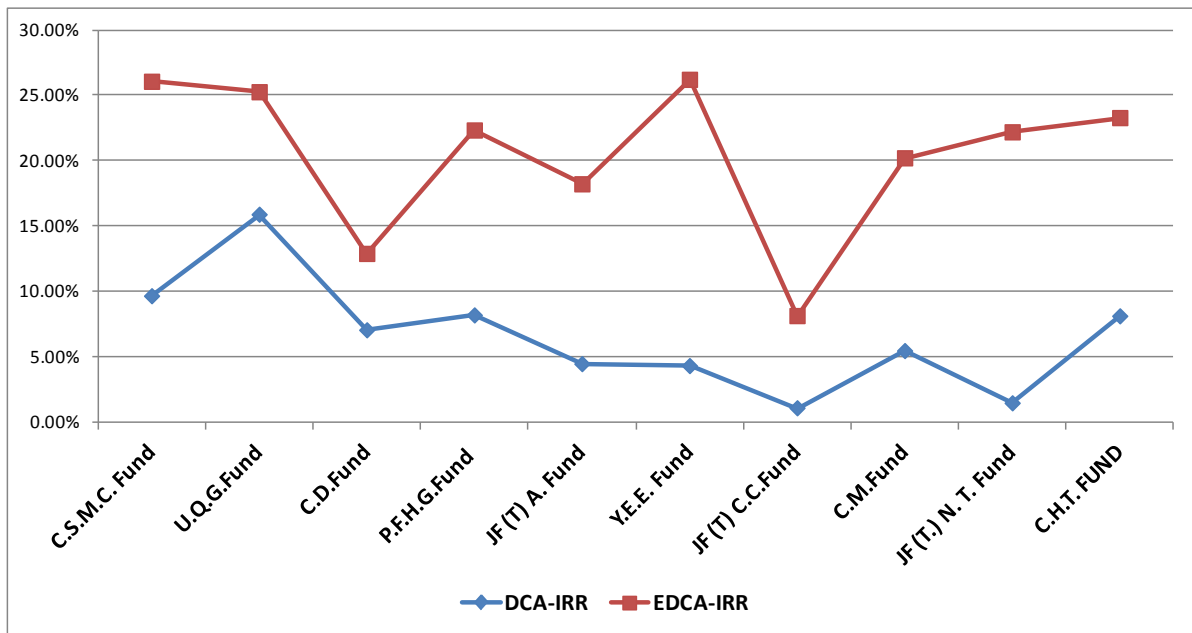


Figure 5-40 120-months investing performance comparison in terms of IRR

From the comparison graphs, it's obvious that EDCA is a more effective strategy to make mutual fund investments. It improves the profitability of mutual fund investment while lower the capital needed, which is important to avoid the situation that running out of the capital too soon and then being forced to cease the investing plan when the market is declining. More importantly, the realization of profit could strength investors' faith toward investment and increase the motivation to stick to the investing plan.

Ch6 Conclusion

The simulation result in either TWSI or Taiwan equity mutual funds reveals that EDCA provides better IRR than current DCA strategy. The main reasons that contribute to superior performance of EDCA could be concluded as below.

1. The high probability of earning profit in an expected investing duration combined with acceptable capital constraints.

The simulation result of starting DCA strategy in TWSI from January 1 of 1990 to October 30 of 2011 in Chapter 4.1 reveals that the possibility to successfully meet the stop gain point at 25% within 48 months is 96.96% while the chance to achieve the same goal within capital constraints of \$250,000 is also as high as 98.70%. The result indicates two important issues. First, even though the market is volatile and no one could predict the market direction in the future, investors still have very high chance to make profit within around 4 years, which strengthen investor's faith toward investing and encourage them to stick to the deduction plan when the market is in the downturn. Second, it allows investors to measure the monthly deduction amount base on their capital available for investment, which prevents capital from being invested too soon at the initial stage to lose the opportunity to increase the portfolio position in the declining market. For example, if available capital for future investment is \$1,000,000.-, then investor could set the basic monthly

deduction amount to be \$20,000.- (equals to $\$5,000 / \$250,000 * \$1,000,000$). Given that, the maximum capital needed within the investing period is \$980,000.- , with accumulated (realized) profit to be \$1,280,033 and IRR to be 16.75%. Meanwhile, if investors could only make small amount deduction monthly, then this study suggests to set the basic monthly deduction amount to be half of the maximum capital that investors could afford. The remaining should be reserved as the stock capital to prepare for the demand of monthly deduction increments in the bear market.

2. Increase portfolio position when market is in the downturn and activate redemption when meeting the stop gain point.

EDCA require investors to double the monthly deduction amount when the NAV of the investing target is lower than the average cost per share by 20%, namely the book rate of return of the investing position is lower than -20%. At this point, increase the portfolio position could effectively reduce the average cost and hence improve the profitability when the market bounces back. And the increments degree should be 2 times the original deduction amount, which facilitates to use the minimum capital to earn the largest profit.

Then, the last important step is to set the stop gain point. With reference to the volatility of TWSI and other Taiwan equity mutual funds, this study suggests to set the stop gain point at 25%. To execute redemption at stop gain point in a disciplined

way is the key to the success of EDCA strategy, which ensures the accumulated profit to be realized. Meanwhile, the proceeds after redemption could actually reinvest into the market. That means investors could have more capital available for investment after redemption.

The EDCA investing strategy is an improvement for current DCA strategy. It enhances the profitability of mutual fund investment while maintain the advantages that DCA has.

More importantly, it is a method that investors could repeatedly implement in mutual fund investment. The performance of each mutual fund is quite different and the standard suggested by EDCA strategy could be adjusted according to the historical performance of each mutual fund to get even better investing results. However, the performance of TWSI is the benchmark for mutual fund performance and therefore, the criteria derived from investing simulation on TWSI is still an applicable reference for investors in mutual fund investment.

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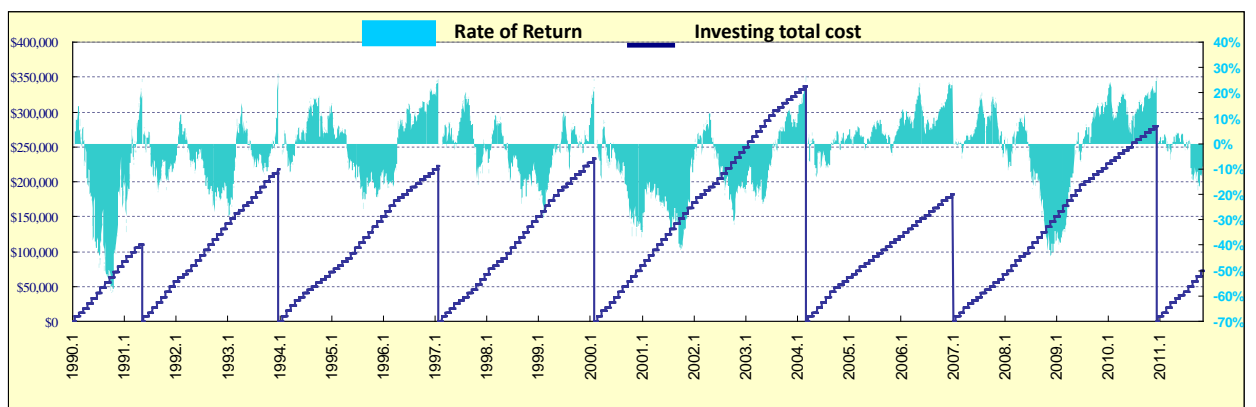
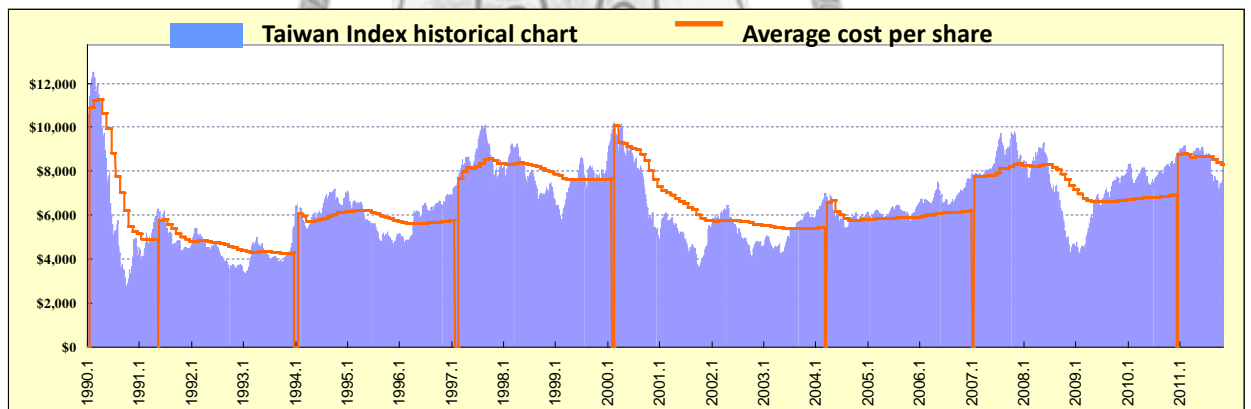
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Appendix 1 How does the increments of the portfolio position in the bear market affect the investing performance and capital control

1. The increments scale of deduction amount is 50%

No.	Starting date	Redemption date	Investing duration	Realized profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	1990/01/01	1991/05/08	16.2	\$28,155	\$110,000	25.60%	4	12
2	1991/05/08	1993/12/23	31.5	\$49,446	\$217,500	22.73%	9	23
3	1993/12/23	1997/01/21	36.9	\$56,712	\$222,500	25.49%	22	15
4	1997/01/21	2000/01/28	36.2	\$60,963	\$232,500	26.22%	15	21
5	2000/01/28	2004/03/02	49.1	\$95,944	\$337,500	28.43%	12	37
6	2004/03/02	2006/12/31	33.97	\$47,342	\$182,500	25.94%	29	5
7	2006/12/31	2010/12/07	47.23	\$72,247	\$280,000	25.80%	29	18
		2010/12/07	2011/10/30	(Unrealized profit=-6.061)	(Capital invested = \$72,500)			

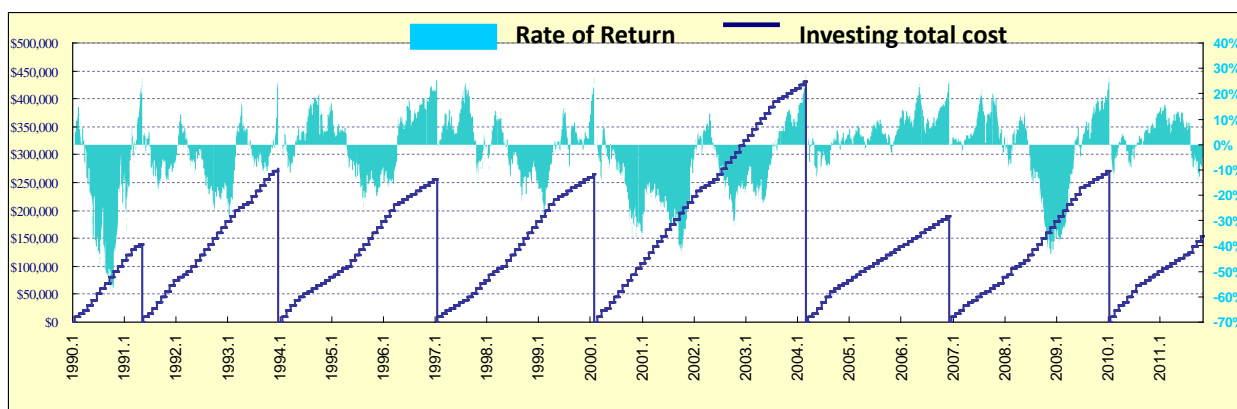
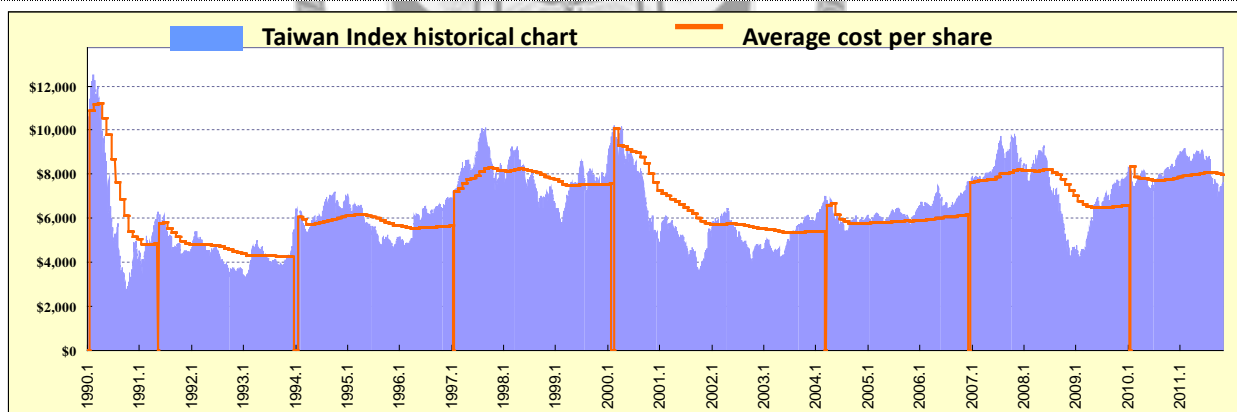
IRR = 17.23%, Maximum drawdown of the investing portfolio=-58.75%,



2. The increments scale of deduction amount is 100%

No.	Starting date	Redemption date	Investing duration	Realized profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	1990/01/01	1991/05/07	16.2	\$38,357	\$140,000	27.40%	4	12
2	1991/05/07	1993/12/17	31.3	\$65,708	\$275,000	23.89%	9	23
3	1993/12/17	1997/01/12	36.8	\$65,149	\$255,000	25.55%	21	15
4	1997/01/12	2000/01/27	36.5	\$71,914	\$265,000	27.14%	21	16
5	2000/01/27	2004/03/02	49.2	\$125,250	\$430,000	29.13%	12	37
6	2004/03/02	2006/12/07	33.17	\$47,731	\$190,000	25.12%	28	5
7	2006/12/07	2010/01/07	37.00	\$67,789	\$270,000	25.11%	20	17
	2010/01/07	2011/10/30		(Unrealized profit=\$-6.986)	(Capital invested = \$155,000)			

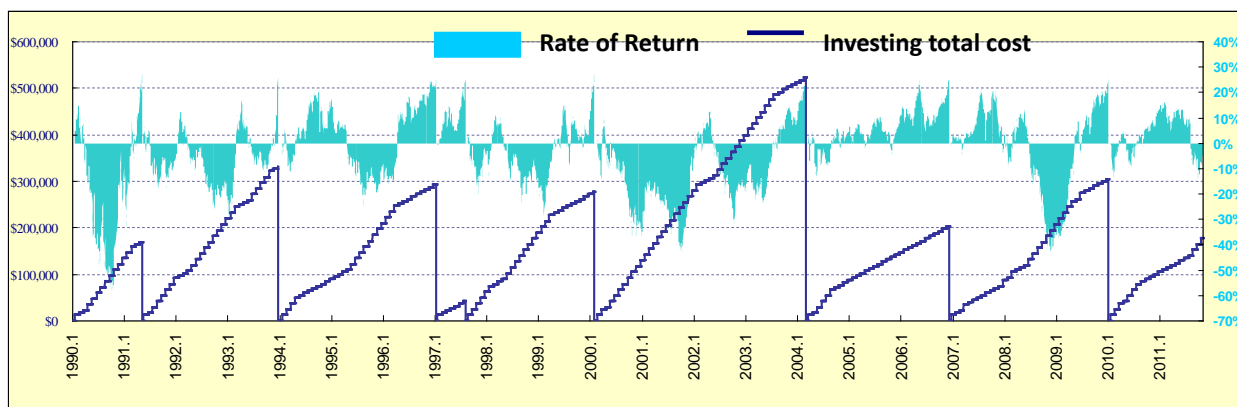
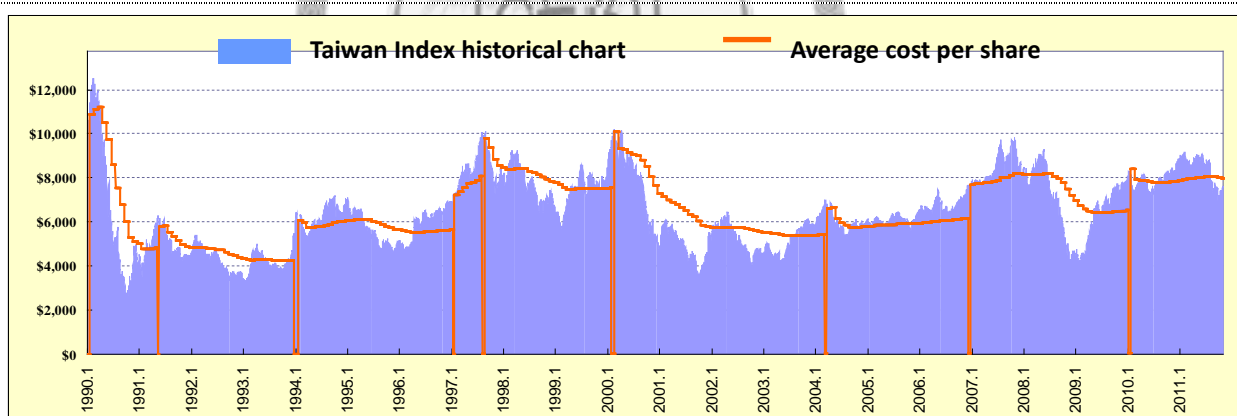
IRR = 18.04%, Maximum drawdown of the investing portfolio=-57.96%,



3. The increments scale of deduction amount is 150%

No.	Starting date	Redemption date	Investing duration	Realized profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	1990/01/01	1991/05/07	16.2	\$48,560	\$170,000	28.56%	4	12
2	1991/05/07	1993/12/17	31.3	\$81,117	\$332,500	24.40%	9	23
3	1993/12/17	1997/01/09	36.7	\$73,050	\$292,500	24.97%	21	15
4	1997/01/09	1997/08/01	6.7	\$10,308	\$42,500	24.25%	6	1
5	1997/08/01	2000/01/27	29.9	\$77,060	\$277,500	27.77%	13	17
6	2000/01/27	2004/02/29	49.07	\$132,744	\$522,500	25.41%	12	37
7	2004/02/29	2006/12/05	33.17	\$49,652	\$202,500	24.52%	28	5
8	2006/12/05	2009/12/31	36.87	\$80,187	\$305,000	26.29%	21	16
	2009/12/31	2011/10/30		(Unrealized profit=\$-7,120)	(Capital invested = \$177,500)			

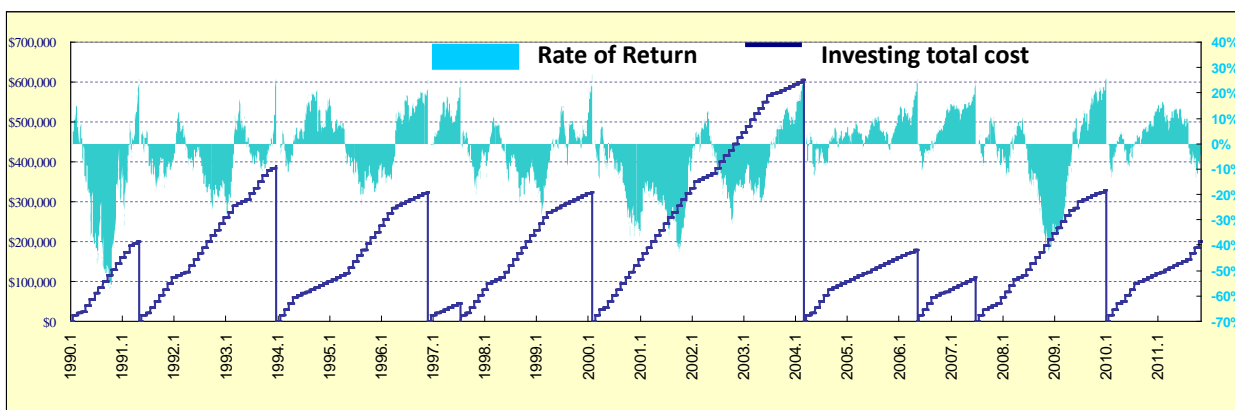
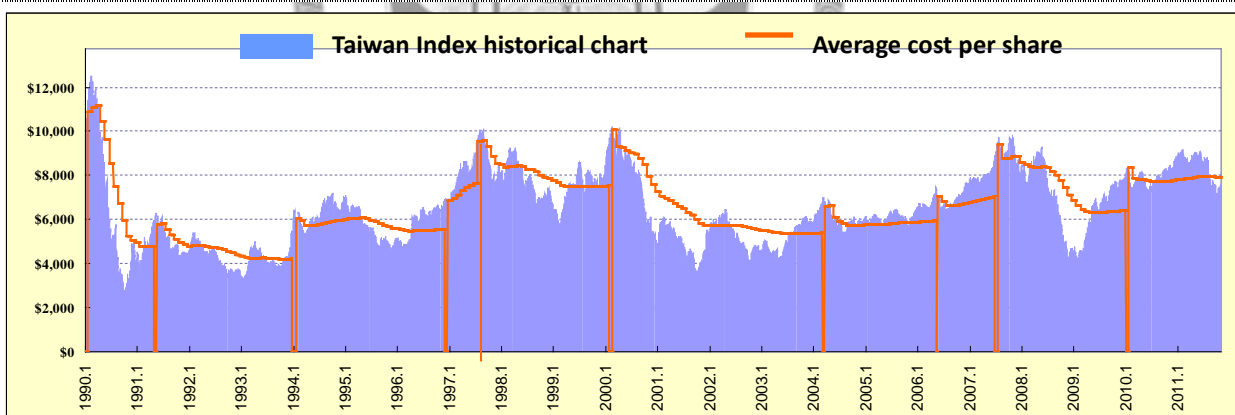
IRR = 18.72%, Maximum drawdown of the investing portfolio=-57.44%,



4. The increments scale of deduction amount is 200%

No.	Starting date	Redemption date	Investing duration	Realized profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	1990/01/01	1991/04/28	15.9	\$51,036	\$200,000	25.52%	4	12
2	1991/04/28	1993/12/17	31.6	\$96,526	\$390,000	24.75%	9	23
3	1993/12/17	1996/11/26	35.3	\$80,828	\$325,000	24.87%	20	15
4	1996/11/26	1997/07/15	7.6	\$11,304	\$45,000	25.12%	6	1
5	1997/07/15	2000/01/27	30.4	\$90,238	\$325,000	27.77%	14	17
6	2000/01/27	2004/02/29	49.07	\$155,658	\$605,000	25.73%	13	36
7	2004/02/29	2006/05/09	26.30	\$43,244	\$180,000	24.02%	21	5
8	2006/05/09	2007/06/22	13.43	\$27,742	\$110,000	25.22%	10	4
9	2007/06/22	2009/12/29	30.23	\$85,319	\$330,000	25.85%	12	18
10	2009/12/20	2011/10/30	(Unrealized profit=\$-7,253)		(Capital invested = \$200,000)			

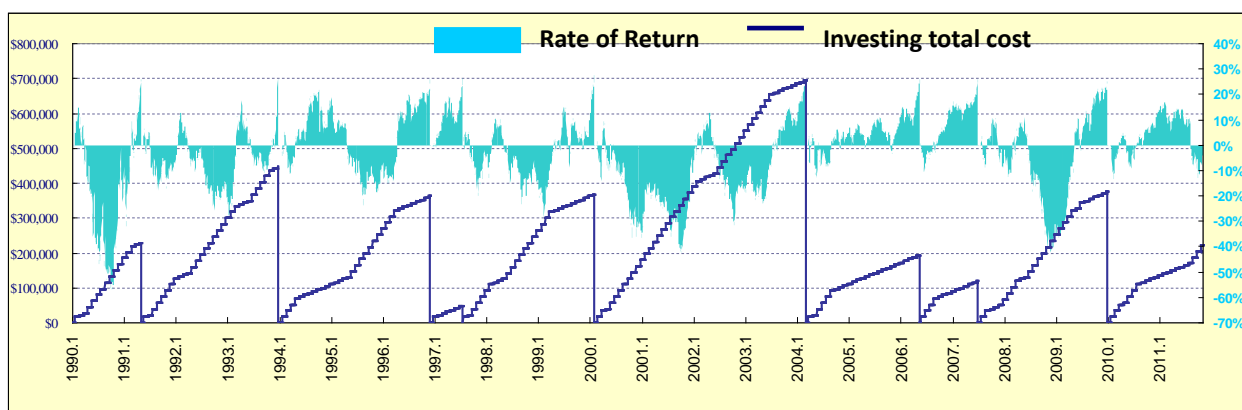
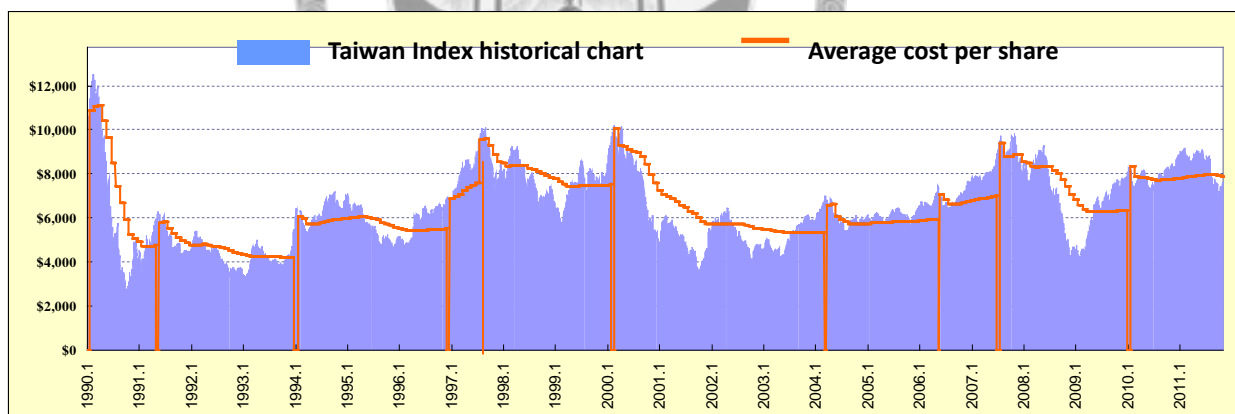
IRR = 18.67%, Maximum drawdown of the investing portfolio=-57.09%,



5. The increments scale of deduction amount is 250%

No.	Starting date	Redemption date	Investing duration	Realized profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	1990/01/01	1991/04/28	15.9	\$60,039	\$230,000	26.10%	4	12
2	1991/04/28	1993/12/17	31.6	\$111,935	\$447,500	25.01%	9	23
3	1993/12/17	1996/11/26	35.3	\$92,961	\$362,500	25.64%	20	15
4	1996/11/26	1997/07/15	7.6	\$12,270	\$47,500	25.83%	6	1
5	1997/07/15	2000/01/27	30.4	\$103,198	\$367,500	28.08%	14	17
6	2000/01/27	2004/02/29	49.07	\$180,423	\$695,000	25.96%	13	36
7	2004/02/29	2006/05/09	26.30	\$47,048	\$192,500	24.44%	21	5
8	2006/05/09	2007/06/22	13.43	\$31,070	\$120,000	25.89%	10	4
9	2007/06/22	2009/12/25	30.10	\$94,587	\$375,000	25.22%	12	18
10	2009/12/25	2011/10/30		(Unrealized profit=\$-7,386)	(Capital invested = \$222,500)			

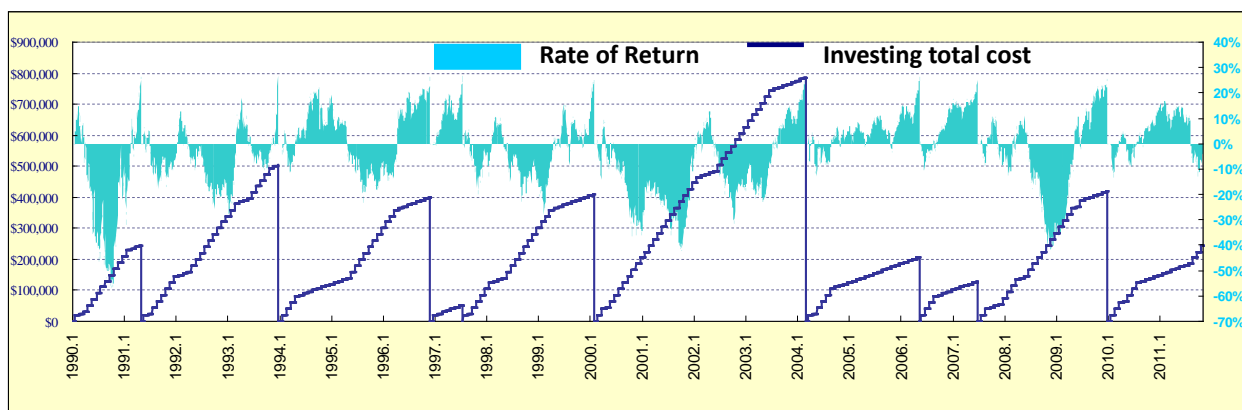
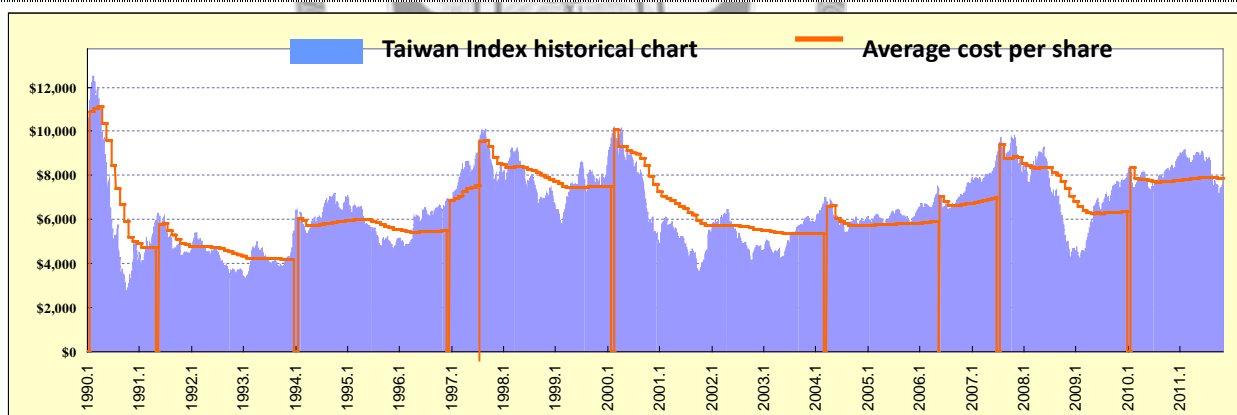
IRR = 18.93%, Maximum drawdown of the investing portfolio=-56.83%,



6. The increments scale of deduction amount is 300%

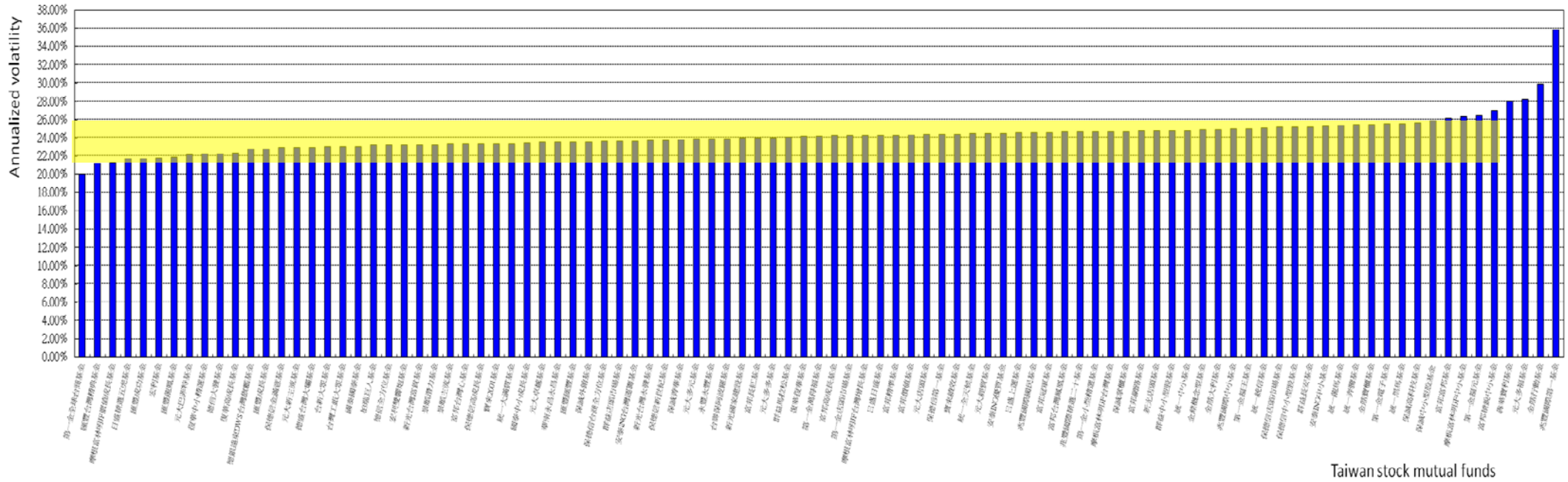
No.	Starting date	Redemption date	Investing duration	Realized profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	1990/01/01	1991/04/28	15.9	\$65,050	\$245,000	26.55%	5	11
2	1991/04/28	1993/12/17	31.6	\$127,344	\$505,000	25.22%	9	23
3	1993/12/17	1996/11/26	35.3	\$105,093	\$400,000	26.27%	20	15
4	1996/11/26	1997/07/15	7.6	\$13,237	\$50,000	26.47%	6	1
5	1997/07/15	2000/01/25	30.3	\$102,135	\$410,000	24.91%	14	17
6	2000/01/25	2004/02/27	49.07	\$205,188	\$785,000	26.14%	13	36
7	2004/02/27	2006/05/09	26.40	\$50,851	\$205,000	24.81%	21	5
8	2006/05/09	2007/06/21	13.40	\$34,502	\$130,000	26.54%	10	4
9	2007/06/21	2009/12/25	30.13	\$108,044	\$420,000	25.72%	12	18
10	2009/12/25	2011/10/30		(Unrealized profit=\$-7,520)	(Capital invested = \$245,000)			

IRR = 18.58%, Maximum drawdown of the investing portfolio=-56.63%,



Appendix 2 Detailed volatility distribution for 97 Taiwan stock funds

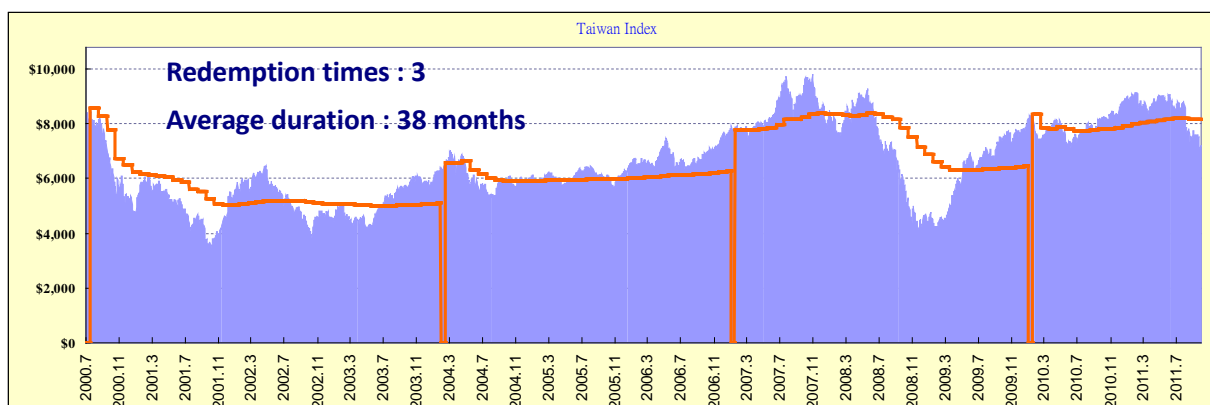
Volatility distribution



Appendix 3 Detailed redemption process of the investing target

TWSI

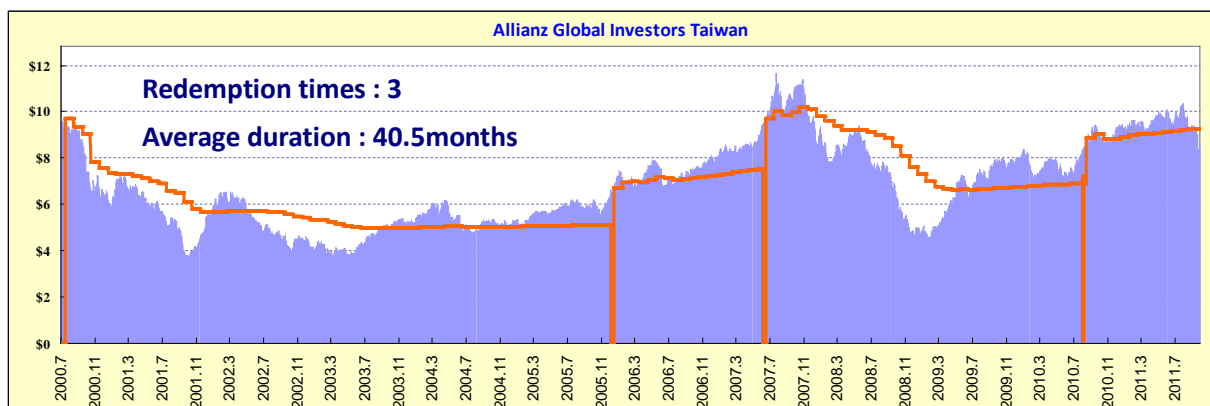
No.	Starting date	Redemption date	Investing duration (months)	Net profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	2000/07/01	2004/01/28	42.9	\$60,198	\$240,000	25.08%	23	5
2	2004/01/28	2007/01/03	35.2	\$46,152	\$175,000	26.37%	10	0
3	2007/01/03	2009/12/31	35.9	\$57,706	\$215,000	26.84%	10	7



* Blue shaded area represents the performance chart of the mutual fund, and the orange solid line denotes the unit cost of the investing position.

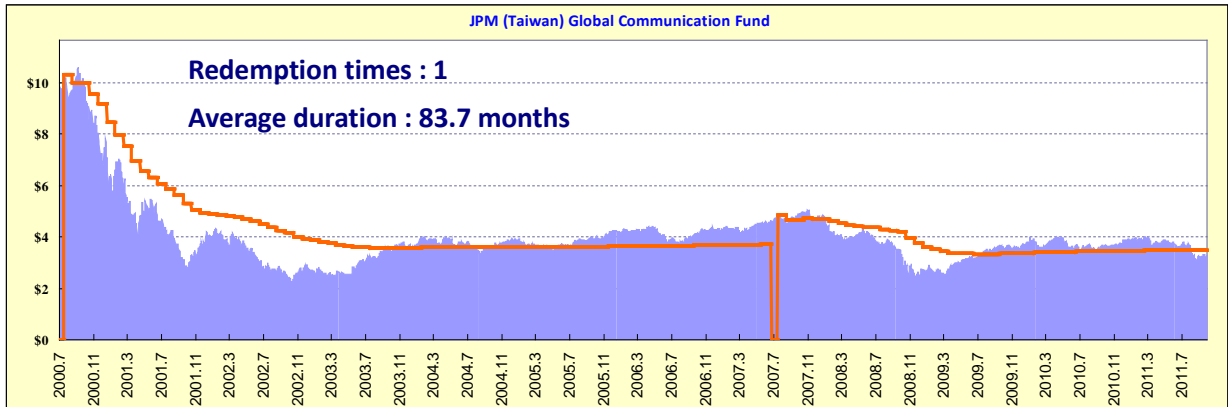
Allianz Global Investors Taiwan Fund

No.	Starting date	Redemption date	Investing duration (months)	Net profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	2000/07/01	2005/12/06	65.2	\$107,304	\$380,000	28.24%	25	11
2	2005/12/06	2007/06/06	18.0	\$21,783	\$90,000	24.20%	4	0
3	2007/06/06	2010/08/15	38.3	\$56,422	\$225,000	25.08%	13	7



JPM (Taiwan) Global Communication Fund

No.	Starting date	Redemption date	Investing duration (months)	Net profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	2000/07/01	2007/06/22	83.7	\$132,927	\$555,000	23.95%	15	27



SinoPac Fund

No.	Starting date	Redemption date	Investing duration (months)	Net profit	Capital Invested	Rate of return	Basic deduction	Increments on deduction
1	2000/07/01	2002/01/23	18.7	\$28,121	\$115,000	24.45%	10	4
2	2002/01/23	2004/02/29	25.2	\$32,560	\$125,000	26.05%	12	0
3	2004/02/29	2006/11/12	32.4	\$40,278	\$160,000	25.17%	23	0
4	2006/11/12	2007/07/24	8.4	\$13,285	\$45,000	29.52%	1	0
5	2007/07/24	2009/06/03	22.3	\$31,625	\$130,000	24.33%	7	4
6	2009/06/03	2011/07/28	25.83	\$33,073	\$130,000	25.44%	5	0

