The Profitability of Moving Average in Taiwan: A New Anomaly

Chao-Hui Yeh
I-Shou University
Taiwan

Abstract

Our paper provides the first study on the cross-sectional profitability of technical analysis. Unlike existing studies that apply technical analysis to either market indices or individual stocks, we apply it to options markets that are very volatile. Option studies have predominately focused on no-arbitrage valuation. However, little is known about investors' trading behavior and actual realized return. This paper contributes to the literature by providing a detailed analysis of my trading behavior and performance in the TXO market using my complete trading record. This paper creates a successful trading strategy for use in the Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX). This paper uses technical analysis to predict TAIEX movement and then use the derivative option (hereafter TXO) in TAIEX to make money. The contribution of this paper is that this paper provides the first study on the TXO profitability of technical analysis. Previous research in technical analysis in financial markets is inconclusive, while TAIEX has never been tested in this regard. This paper found the moving average (hereafter MA) trading rules generates a strictly positive excess return, even if corrections are made for transaction costs, risk and data snooping. For TAIEX, technical analysis method of MA can beat the buy-and-hold (hereafter BH) trading strategy. Two trading strategies: sell-put option strategy and sell-call option strategy, were considered, and were subsequently tested through manual and programming trading. Good trading philosophies are those both combine Technical Analysis and fundamental analysis together, also psychological financial market. If both Technical Analysis and fundamental analysis point in the same way, then technical trading can be successful. The TXO is far more profitable to sell advice than to buy it. The data consist of daily closing prices of the Taiwan Stock Exchange (TWSE) stock index, TAIEX. The time period concerned is 2010/01 to 2012/06, which produces a sample size of 883 daily records. Transaction costs are incorporated in this study. Our findings suggest that for MA of 5 days, the (hereafter MA$_5$) MA$_5$ method beats the BH trading strategy. This result is striking because it holds true for both the bullish investment position (sell-put option strategy) and even stronger for the bearish investment position (sell-call option strategy). The sell-put option strategy yields a totally absolute return of NTD495455 that is absolutely much better than the BH trading strategy. The sell-call option strategy yields a total return of NTD858595 that is also absolutely much better than the BH trading strategy. Many past papers report the negative bearish signals return that is sell-call in this paper. But we have positive sell-call signals return in this paper.

JEL: G14, G15

Keywords: Technical analysis; Moving Average; Taiwan stock index options

1. Introduction

This paper uses technical analysis and applies to TAIEX. (TAIEX: description of TAIEX Indices is in APPENDIX) Their profitability as well as their forecasting ability will be statistically tested. Corrections will be made for transaction costs, risk and data snooping to answer the question whether one can really profit from perceived trending behavior in financial time series.

Technical analysts argue that prices gradually adjust to new information. Thus, historical analysis is useful in diagnosing the repeated pattern behaviors leading to active investment strategies that generate better-than-market returns. In contrast, fundamental analysis is a methodology of determining the true value of a security, based on macro-economic.

The assumption that market behavior embodies and reflects relevant information has a great impact on securities prices. Any change in the relevant information causes price adjustment. This paper report how the world's current economic, political and psychology interrelate with the financial market; everything affects everything!

This paper use technical analysis to predict TAIEX movement and then use the derivative option (hereafter TXO) in TAIEX to make money. One of the features that make TXO trading so popular today is the leverage. Taiwanese option market (TXO) may allow for up to a 200:1 leverage. An interesting consequence of this leverage system is that it becomes possible for an investor to lose more than the original amount invested. Thus, TXO brokers hold the right to exercise a margin call. Margin calls occur when an investor no longer has enough free margin in their account to maintain a current position, in which case the transaction is closed immediately.

The main criticism of technical analysis is that it seems to have no plausible explanations as to why these patterns should indeed be expected to repeat. Malkiel (1996) provides an up to date summary of such criticism. Given the inconclusive evidence concerning technical analysis in general and the moving average (MA) method in particular it would be interesting to apply this method to the emerging market of Taiwan, for which no such study of a major stock index of the TAIEX has been reported yet. It would also be interesting to investigate the extent to which the MA method, applied to the TAIEX outperforms the simple buy- and-hold (BH) trading strategy.

Since both technical analysis and fundamental analysis each provide a unique view of the same picture. Their use as complimentary methods can be quite successful. A possible reason for the success of the MA method found in this study for the TAIEX may be related to the fact that technical analysis, including the MA method, is more prevalent in the Taiwan so that, as with any widely used method, the benefit of using the method is unlimited. Despite the legitimate criticism arising due to the arbitrary nature of the MA method, it is difficult to ignore the relative success of technical analysis methods reported in prior research and found in this study, too, particularly for emerging capital markets characterized by a relatively low degree of market efficiency. This study's results for the TAIEX Index in Taiwan imply that further empirical tests are required in order to determine more accurately the efficiency degree of emerging capital markets such as that of Taiwan studied here. Hence, in short, after correcting for transaction costs, risk and data snooping, we conclude that objective trend-following technical trading techniques, applied to TAIEX, is genuine superior to the buy-and- hold benchmark.

The organization of the rest of this paper is as follows. Section II provides a brief review of the relevant literature. Section III describes the moving average method; Section IV discusses the methodology and the data; Section V presents the findings, and analyses the empirical results; and the last section contains a brief summary and conclusion.

2. Literature Review

Technical analysis has its roots in the belief that information contained in past prices is not correctly incorporated in current prices (Ellinger, 1971) Theil and Leenders (1965) investigate the dependence of the proportion of securities that advance, decline or remain unchanged between successive days for approximately 450 stocks traded at the Amsterdam Stock Exchange in the period November 1959 through October 1963. They find that there is considerable positive dependence in successive values of securities advancing, declining and remaining unchanged at the Amsterdam Stock Exchange. It is concluded that if stocks in general advanced yesterday, they will probably also advance today.

Murphy (1986) defines technical analysis as the study of past price movements with the goal to forecast future price movements, perhaps with the aid of certain quantitative summary measures of past prices such as "momentum" indicators ("oscillators"), but without regard to any underlying economic, or "fundamental" analysis. Another description is given by Pring (1998) who defines technical analysis as the "art" of detecting a price trend in an early stage and maintaining a market position until there is enough weight of evidence that the trend has reversed.

The general consensus among technical analysts is everything that is happening in the world can be seen in the price charts. A popular saying among chartists is that "a picture is worth a ten thousand words." The philosophy behind technical analysis is that information is gradually discounted in the price of an asset. It is said that price gradually moves to new highs or new lows and that trading volume goes with the prevailing trend. Therefore most popular technical trading rules are trend following techniques such as moving averages and filters.

Technical analysis tries to detect changes in investors' sentiments in an early stage and tries to profit from them. It is said that these changes in sentiments cause certain patterns to occur repeatedly in the price charts, because people react the same in equal circumstances.

At this point it is useful to illustrate technical trading by a simple example. One of the most popular technical trading rules is based on moving averages. A moving average is a recursively updated, for example daily, weekly or monthly, average of past prices.

A moving average smoothes out erratic price movements and is supposed to reflect the underlying trend in prices. A buy (sell) signal is said to be generated at time t if the price crosses the moving average upwards (downwards) at time t.

However, technical analysts acknowledge that their techniques are by no means foolproof.

For example, Martin Pring (1998, p.5) notices about technical analysis: "It can help in identifying the direction of a trend, but there is no known method of consistently forecasting its magnitude.'" Edwards and Magee (1998, p.12) notice: "Chart analysis is certainly neither easy nor foolproof." Finally, Yeh (2001) remarks:"..., I caution you not to let the software lull you into believing markets are as logical and predictable as the computer you use to analyze them." Hence, even technical analysts warn against investment decisions based upon their charts alone.

A high proportion of chief dealers view technical and fundamental analysis as complementary forms of analysis and a substantial proportion suggest that technical advice may be self-fulfilling. There is a feeling among market participants that it is important to have a notion of chartism, because many traders use it, and may therefore influence market prices. It is said that chartism can be used to exploit market movements generated by less sophisticated, 'noise traders'

Kho (1996) tests a limited number of double crossover moving-average trading rules on weekly data of BP, DEM, JPY, SF futures contracts traded on the International Monetary Market (IMM) division of the Chicago Mercantile Exchange from January 1980 through December 1991. The results show that there have been profit opportunities that could have been exploited by moving-average trading rules. The measured profits are so high that they cannot be explained by transaction costs, serial correlation in the returns or a simple volatility expected return relation (GARCH-in-mean model). Next, Kho (1996) estimates a conditional CAPM model that captures the time-varying price of risk. It is concluded that the technical trading rule profits found can be well explained by time- varying risk premia.

Ratner and Leal (1999) apply ten moving-average trading rules to daily local in- dex inflation corrected closing levels for Argentina (Bolsa Indice General), Brazil (Indice BOVESPA), Chile (Indice General de Precios), India (Bombay Sensitive), Korea (Seoul Composite Index), Malaysia (Kuala Lumpur Composite Index), Mexico (Indice de Precios y Cotaciones), the Philippines (Manila Composite Index), Taiwan (Taipei Weighted Price Index) and Thailand (Bangkok S.E.T.) in the period January 1982 through April 1995. After correcting for transaction costs, the rules appear to be significantly profitable only in Taiwan, Thailand and Mexico. However, when not looking at significance, in more than 80% of the cases the trading rules correctly predict the direction of changes in prices.

Ming Ming, Mat Nor and Krishnan Guru (2000) find significant forecasting power for the strategies of Brock et al. (1992) when applied to the Kuala Lumpur Composite Index (KLCI) even after correction for transaction costs. Grandia (2002) utilizes in his master's thesis the RC and the SPA-test to evaluate the forecasting ability of a large set of technical trading strategies applied to stocks quoted at the Amsterdam Stock Exchange in the period January 1973 through December 2001.

He finds that the best trading strategy out of the set of filters, moving averages trading rules can generate excess profits over the buy-and-hold even in the presence of transaction costs.
Conclusions from the literature

Technical analysis is heavily used in practice to make forecasts about speculative price series. However, early statistical studies found that successive price changes are linearly independent, as measured by autocorrelation, and that financial price series may be well defined by random walks.

In that case technical trading should not provide valuable trading signals. However, it was argued that the dependence in price changes might be of such a complicated nonlinear form that standard linear statistical tools might provide misleading measures of the degree of dependence in the data. Therefore several papers appeared in the academic literature testing the profitability of technical analysis. The general consensus in academic research on technical analysis is that there is some but not much dependence in speculative prices that can be exploited by nonlinear technical trading rules. Moreover, any found profitability seems to disappear after correcting for transaction costs and risk.

Most papers consider a small set of technical trading rules that are said to be widely known and frequently used in practice. This causes the danger of data snooping. However, after correction for the specification search, it is still found that those technical trading rules show forecasting power in the presence of small transaction costs.

In this paper I confine myself to objective trend-following technical trading techniques that can be implemented on a computer. In this paper I test the moving-average rules.

3. *The Moving Average Method*

Moving-average (MA) trading rules are the most commonly used and most commonly tested technical trading strategies. Moving averages are recursively-updated averages of past prices. They yield insight in the underlying trend of a price series and also smooth out an otherwise volatile series. Short (long) term trends can be detected by choosing n small (large). The larger n, the slower the MA adapts and the more the volatility is smoothed out. Technical analysts therefore refer to a MA with a large n (The TAIEX always rebound when hitting its 200-day moving average, a key technical support level) as a slow MA and to a MA with a small n as a fast MA. MA trading rules make use of one or two moving averages. A special case is the single crossover MA trading rule using the price series itself and a MA of the price series. If the price crosses the MA upward (downward) this is considered as a bullish (bearish) signal. The double crossover MA trading rule on the other hand uses two moving averages, a slow one and a fast one. The slow MA represents the long run trend and the fast MA represents the short run trend. If the fast MA crosses the slow MA upward (downward) a bullish (bearish) signal is given. Moving averages (MA) identify trend direction and strength. When the slope is positive it indicates an uptrend, and when it's negative a downtrend. The steepness of the slope is proportional to that trend's strength. Signals of MA are generated by a crossing of the price through a moving average of past It is possible to plot more than one MA at a time that can combine to indicate buy and sell points. One common method is plotting a fast moving average against a slower one. For example, the faster one follows the trend better so the period is smaller, say 1 and the slower one would have a period of more than 1, say 5. If the faster one cuts under the slower one it is a "bearish" crossover and it indicates a sell point. If the fast one cuts above the slower one it is a "bullish" crossover and one might consider buying.

The moving average (MA) method is one of the most widely used methods of technical analysis. It includes different versions and levels of sophistication. As distinct from a diagrammatic technical analysis, the MA method is easy to quantify and apply in investment decision-making or empirical tests. Methods of technical analysis that are based on diagrammatic analysis methods are subjective and hence difficult to apply or examine empirically. The MA method in contrast enables the construction of a computerized algorithm for the application of the method, and the indications of bullish (bearish) signals. A moving average is an average of observations (transactions in this paper) from several consecutive time periods. To compute a moving average sequence, we compute successive averages of a given number of consecutive observations. The objective underlying the MA method is to smooth out seasonal variation in the data. This technical-analysis method is intended to provide a decision rule concerning the appropriate investment position.

The method involves a comparison of the most recent market price or index with the long-period MA of the price or index vector. If the current price is higher by a certain buying filter than the long-period MA, a bullish investment position should be adopted, and conversely, if the current price is lower by a certain selling filter than the MA, a bearish position should be adopted. In another variant of the method, the current price or index can be replaced with a short-period MA, so that the use of the method involves the comparison of the short-period MA with the long-period one. 一個看漲的的投資倉位應採納，一個看跌的倉位應採納。

This description of the MA method is general, and allows a high degree of parameter-value flexibility. This also raises a question concerning the best or most appropriate MA method version. For example, how many days are to be included in the average? How many averages should be used to obtain a signal? What price should be used when calculating the average (close price, close price, high, low, average)? Which average should be used (linear, weighted, and logarithmic); what is the size of the optimal filter? The MA method is a "leading indicator" method; it follows the trends that are developing in the market. The aim of the method is to identify or signal a new trend that is developing in the market, or to signal the end of an old trend. The method attempts to forecast the future behavior of the market in a manner different than that a chart analysis purports to do. The MA is a "smoothing" mechanism, and it facilitates the identification of a trend. At the same time, the MA lags behind what is happening in the market. The shorter the MA, the less it lags, and it follows the market more closely. A long-period MA, in contrast, is less sensitive to market fluctuations and it lags behind the market more than a short-period MA does. It would thus be interesting to compare short-period and long-period MAs based on their predictive power.

There are two common types of moving averages, exponential and simple that are explained below.

3.1 Simple Moving Average (SMA)

The simplest form of the moving average compute the average value of the past x daily closing price, where the user can choose x. Say you set x to be 5. For any given point in time on the SMA plot, that value was determined by the average of the last 5.

The MA investment timing strategy is to buy (bullish) or continue to hold the investment today when yesterday's price is above its 10-day MA price, and to sell (bearish) otherwise.

$$SMA = \frac{P_1 + P_2 + \bullet \bullet P_n}{n}$$

Where n is the number of past prices (data) used
In the above equation, P_n represents the nth most recent data point of the user-selected price. For instance, if the user wanted a simple moving average of the past 5 days using closing prices, P_1 would be yesterday's closing price and P_5 would be the closing price 5 days ago. All of these are summed together and then divided by the number of days. The SMA also is called equally weighted moving averages.

3.2 Exponential Moving Average

Very similar to the SMA but it places more weight on recent data. So for an EMA with a period of 5 days, data points from the most recent day would weigh more than the 2nd most recent day and so on. Traders tend to use exponential averages more because more recent prices are considered more relevant than older ones, which the simple moving average does not consider.

The simple MA gives equal weight to all the observations of the average. Critics of the simple MA contend that greater weight should be given to more recent observations. The simple MAs have the problem of excluding observations that fall out of the average considered range. This problem is solved by the exponential MA, which considers all the existing observations in the database. It should be emphasized, however, that the differences between the two types of averages noted here do not necessarily imply that one type of MAs is superior upon the other. When a short-period MA is used, the average strictly follows the market index, and the market index frequently intersects the average.

On one hand, a sensitive (short-period) MA gives many buying and selling signals and creates a high frequency of position changes, which results in high transactions costs, and relatively many false signals. This is the bad side of short-period MA. On the other hand, a sensitive (short-period) MA gives earlier signals of a new market trend. This is the good side of short-period MA. Both sides create a dilemma concerning the length of the average to be used. The objective is to find a sufficiently sensitive average which gives signals at the early stage of a new trend, but not so sensitive to be affected by market noise which cause false signals. A less sensitive (long) MA is more efficient when the market maintains a direction.

Such an average will not be influenced by market noises as long as the trend exists. But the disadvantage of a long-period average is that it is slow in responding to changes in the direction of the market, and signals to this effect are received comparatively late. This implies that a long-period MA is more efficient when the direction remains fixed, while the short-period MA is more efficient in times of direction changes. That is the reason why technicians generally use a number of moving averages at the same time. Several computer programs and Internet sites enable their users to create many types of MAs and examine their behavior under various market trends. As we have pointed out, there is no reason to assume that a specific MA that works best in one type of market will also work for another type of market.

In this paper we use the SMA (equally weighted moving averages).

3.3 There is the third type of MAs: weighted (linear) MA

The weighted (linear) MA attempts to solve the equal-weight problem of the simple MA. For an MA of n observations, the first observation is multiplied by n, the last observation is multiplied by one, and the total amount is divided by n (n+1)/2, so that the more recent observations are given a greater weight in the average. Both the simple and the weighted MAs share the problem of excluding observations which fall out of the average considered range. This problem is solved by the exponential MA, which considers all the existing observations in the database. In addition, the exponential MA, like the weighted MA, also gives greater weights to more recent observations.

4. Methodology and Data

The moving average (MA) method is a type of technical analysis intended to provide a decision rule concerning the appropriate investment position to adopt at a given point in time. For TAIEX market index, it involves the comparison of the most recent index level or its short (say, 1 day) MA with the long-period MA of the index. If the short MA is higher than the long-period MA, a bullish investment position should be adopted, and if it is lower, a bearish position should be adopted. A short 1-day MA and varying long-period MAs of 5 and 20 days are used in this study. For these two pairs of MAs, I have found the MA_5 strategies to be the most useful and profitable trading strategies.

Of the strategies described above, two investment strategies are used: sell-put option and sell-call option.
I use a trend following trading strategy, meaning that I sell-put option when the market is moving upwards and sell-call option when the market moves downwards, making trades only when my confidence in the trend is very strong. The return on each of these two strategies is then compared to the return achieved on a buy-and-hold policy for the same period of time. If the strategy's return is higher, it implies weak-form market inefficiency.
No matter which strategy I am using, I always wait for the price movement to indicate to me that my prediction is being followed. When a bullish signal is received, I always sell the put option and the strike price is the MA_5 of the TAIEX. On the other hand, I always sell the call option when I receive a bearish signal. Money profits or loses (NOT rate of return) is computed for each holding period whose length is determined by the signal received from the MA method. The total money profits or loses (details in picture 2) for the whole test period is then compared to the total return on the simple BH trading strategy.

An additional measure, which can imply that the MA method can be superior to the simple buy and hold policy, is the "success signal proportion" which is the ratio of the number of successful signals over the total number of signals. The latter is in fact the total number of transactions, or position changes, suggested by the MA method for a given period of time. A success is defined when the actual market movement of the index is in the direction predicted by the MA signal. The time period covered is 2010/1 to 2012/6 to, which produces a sample size of 883 observations (the total number of transactions records). The data source is from http://tie.tier.org.tw/index.asp.
For each data, the daily close price is used. To be consistent with prior research, the simple arithmetic average is applied to the close price of the data source.

5. Results

The tests results of the MA method are reported in Tables 1 and 2 and Figure 1 for the TAIEX Index.
From table 1, we can see the MA method yields a much higher return than the BH trading strategy.

For the bullish investment position (sell-put option strategy), the sell-put option strategy yields a totally absolute return of NTD495455 (proof in figure 1) for the entire test period compared with 2% for the BH trading strategy. For the bearish investment position (sell-call option strategy), the sell-call option strategy yields a total return of NTD858595 for the entire test period compared with 2% for the BH trading strategy.

From table 1, we also can see the MA method yields a much higher success proportion.

The relatively very high success proportion of 98%($866/883 = 0.98$) strengthens this result. Of the total number of 883 transactions suggested by the MA method for the studied sample time period, 866($301+565 = 866$)) transactions were found successful in the sense that a signal (bullish or bearish) produced a positive return. In other words, for a bullish signal for which the 1-day short-period MA crosses the long-period MA of 5-day MA in an upward direction the subsequent actual market trend was positive, as the signal indicated for the bullish position. For a bearish signal, for which the 1-day short-period MA crosses the long period 5-day in a downward direction, the subsequent actual market trend was negative, implying a positive return on the bearish position suggested by the signal. Though transaction costs may lower the net return on the MA method, it is important in this context to note that TXO charge each NT\$25 as each transaction cost that is very low transaction cost.

The following is the comparison between the sell- call option strategy and the sell-put option strategy.

1. For the bullish investment position (sell-put option strategy), the sell-put option strategy yields a totally absolute return of 495455(Absolute return differs from relative return because it is concerned with the return of a particular asset and does not compare it to any other measure or benchmark.).
2. Of the total number of 312 transactions, 301 transactions were found successful in the sense that a signal (bullish) produced a positive return. A success is defined when the actual market movement of the index is in the direction predicted by the MA signal.
3. The success rate is 0.96474($301/312 = 0.9647$) for the sell-put option strategy.
4. The success rate is 0.98949 ($565/571 = 0.989$) for the sell- call option strategy.
5. The success rate is found higher for the sell- call option strategy ($565/571 = 0.989$) than for the sell-put option strategy ($301/312 = 0.9647$).
6. The totally absolute return is found higher for the sell- call option strategy (NTD858595) than for the sell-put option strategy (NTD495455).
7. For the sell-put option, the number of successful transactions is 301 which yields an average (per transaction) return of NTD1588, while for the sell-call option, the number of successful transactions is 565 yielding an average return of NTD1504.
8. The maximum return is found higher for the sell- call option strategy (NTD75950) than for the sell-put option strategy (NTD19800).
9. The minimum return is found lower for the sell- call option strategy (NTD -11000) than for the sell-put option strategy (NTD -2275).

Table 1: Moving average returns and success proportion for the TAIEX Index

Rate of return per year on BH[1]	2%(invest in the 30-day Treasury bill holding cash per year)
Total Returns on sell-put option[2]	NTD495455
Total Returns on sell-call option[2]	NTD858595
Number of Successful sell-put option strategy[4]	301($301/312 = 0.9647$)
Number of Successful sell-call option strategy[4]	565($565/571 = 0.989$)
Total Number of Successful sell-put and sell-call Signals	866($301+565 = 866$)
Total Number of Transactions	883($312+571 = 883$)
Success Proportion (%)[5]	98%($866/883 = 0.98$)

1. A passive investment strategy in which an investor buys stocks and holds them for a long period of time, regardless of fluctuations in the market. An investor who employs a buy-and-hold strategy actively selects stocks, but once in a position, is not concerned with short-term price movements and technical indicators.
2. Total Returns on sell-put option[2] strategy is the total return for the test period achieved from maintaining a bullish position when the MA signal is upward, and Total Returns on sell-call option[2] strategy when the MA signal is downward.
3. Average Return on sell-put option[3] is the (per transaction) average return achieved for all Returns on sell-put option[3] transactions during the test period, while Average Return on sell-call option[3] is the (per transaction) average return achieved for all Returns on sell-call option[3] transactions.
4. A successful sell-put Signals[4] (sell-call Signals[4]) is a signal, which successfully predicts an upward (downward) market trend of the index.
5. The Success Proportion (%)[5] is the ratio of the total successful sell-put signals[4] (sell-call signals[4]) over the total number of signals (or transactions) during the test period.

Furthermore, sell-call option strategy makes more money than sell-put option strategy makes. The total return on the on sell-call option strategy is NTD858595, and for the sell-put option strategy it is as low as NTD495455, implying a higher success rate (or equivalently a lower failure rate) in the sell-call option signals mainly.

Figure 1:
1. For the bullish investment position (sell-put option strategy), the sell-put option strategy yields a totally absolute return of 495455(Absolute return differs from relative return because it is concerned with the return of a particular asset and does not compare it to any other measure or benchmark.).
2. Of the total number of *312* transactions, *301* transactions were found successful in the sense that a signal (bullish) produced a positive return.
3. The success rate is 0.96474($301/312 = 0.9647435897$) for the sell-put option strategy.
4. The success rate is 0.98949 ($565/571 = 0.9894921191$) for the sell- call option strategy.
5. The success rate is found higher for the sell- call option strategy ($565/571 = 0.9894921191$) than for the sell-put option strategy ($301/312 = 0.9647435897$).
6. The totally absolute return is found higher for the sell- call option strategy (858595) than for the sell-put option strategy (495455).
7. For the sell-put option, the number of successful transactions is *301* which yields an average (per transaction) return of 1588, while for the sell-call option, the number of successful transactions is *565* yielding an average return of 1503.67.
8. The maximum return is found higher for the sell- call option strategy (75950) than for the sell-put option strategy (19800).
9. The minimum return is found lower for the sell- call option strategy (-11000) than for the sell-put option strategy (-2275).

Table 2 reports my data from 2010/05/23 to 2010/11/30. I first compute the profits and realized returns of each round trip of my trades. The aggregate of my profits/loss is $NTD 461,445. The realized profits/loss is based on the actual transaction prices that account for the commissions, tax and the bid-ask spreads.

6. Conclusions

This paper tells you my returns in the Taiwan stock index options (hereafter TXO). TXO is issued by Taiwan Index Futures Exchange (hereafter TAIFEX) based on Taiwan Stock Exchange Capitalization Weighted Stock Index (hereafter *TAIEX*) From this paper you will know my trading strategy (behavior) in TXO. , Which comprises puts & calls. In TXO, I most often sell out-of-the-money calls (hereafter calls) and second often sell out-of-the-money puts (hereafter puts). Selling call giving me the best returns, while selling put giving me the second best returns. In this paper, because I never build my open position by buying TXO, doing selling side always initializes My TXO position. Also, I never initialize in-the-money puts or calls, in this paper all puts / calls are out-of-the-money. In TXO, I either initialize and hold till to expires or buy back to offset (close/liquidate) positions If I initialize TXO and hold till to expire, the liquidating trade that completes this round trip is to exercise the option at maturity (paying the intrinsic value of the option at maturity, if it is in the money). On average I win after transaction costs are taken into account from trading options, even only I use the simplest trading strategy -- sell TXO with MA timing. No matter the market condition is bullish or bearish, I always win by doing selling side. No matter which strategy I am using.

This paper compares the Taiwan Stock Exchange (TWSE) to the TAIEX / TAIFEX Index, with respect to the extent that a selling TXO with MA timing can beat the simple buy-and-hold (BH) trading strategy. Previous researches are inconclusive, while TAIEX was never tested in this respect. The moving average (MA) method is a type of technical analysis intended to provide a decision rule concerning the appropriate investment position to adopt at a given point in time. A possible reason for the success of the MA method found in this study may be related to the fact that technical analysis, including the MA method, is more prevalent in Taiwan so that, the more investors use MA method; the more investors get the benefit of using the method. Despite the legitimate criticism arising due to the arbitrary nature of the MA method, it is difficult to ignore the relative success of technical analysis methods reported in prior research and found in this study, too, particularly for emerging capital markets characterized by a relatively low degree of market efficiency. Another possible reason for the success of the MA method found in this study may be related to the fact that because the TXO is a highly risky asset that I hold, I bear the corresponding reward. Then prices of TXO need not be perfectly random, even if TAIEX markets are operating efficiently and rationally.

This study's results for the TAIEX Index in Taiwan imply that further empirical tests are required in order to determine more accurately the efficiency degree of emerging capital markets such as that of Taiwan studied here.

My record tell you

(1) My trading strategy is simple but not easy. Selling and hold out-of-the-money TXO is simple but obeying this rule is not easy.
(2) I prefer to start to sell and open a new position regardless of market condition, the moneyness and maturity. In my OI, I most often have net short position in puts & calls with out-of-the-money.
(3) In my OI, I most often have a position with maturity less than 20 days.
    My OI period is 4 days averagely.
(4) TXO held for short periods and sold prior to expiry exhibit average returns.
(5) The average realized returns for long index option positions are significantly lower than the short index option positions.

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Appendix

A brief description of TAIEX Indices

Item	Description
Underlying Index	Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX)
Last Trading Day	The third Wednesday of the delivery month= Expiration Date
Final Settlement Price	The average price of the underlying index disclosed within the last 30 minutes prior to the close of trading on the final settlement day.
Settlement	Cash settlement. An option that is in-the-money and has not been liquidated or exercised on the expiration day shall, in the absence of contrary instructions delivered to the Exchange by the Clearing Member representing the option buyer, be exercised automatically

※Taiwan Futures Exchange Corporation Trading Rules for Taiwan Stock Exchange Capitalization Weighted Stock Index Options Contracts