The Investment Behavior, Decision Factors and Their Effects Toward Investment Performance in the Taiwan Stock Market

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ABSTRACT

This study aims to discuss how investment behavior and decision factors affect performances of the Taiwan stock market. The research targets are randomly selected Taiwan stock market investors. Through use of examining the frequency distribution tables and one-way ANOVA, background variables of investors were explored in an examination of how these variables affect the investment behavior and decision factors towards performance on the Taiwan stock market. To further analyze the correlations among variables, this study implemented Pearson Product-moment Correlation Coefficient, which included verification of significant effects on investor behaviors and decision factors. CATREG (regression with optimal scaling) were adopted to predict effects on investment behavior and decision factors towards performance on the Taiwan stock market, and to explain correlation among variables. The study hypothesized that there was no significant differences between investment behavior and decision factors with the investor's background variable. However, this study result concluded that there indeed existed significant differences on investor decision-making on market selection according to their assets. On the other hand, other variables, such as gender, age, marital status, education, career and job lever income, and average amount for quarterly investment appeared not to have significant differences. Furthermore, among the variables, the most significant influential factors on the performance on the Taiwan stock market were macroeconomic forces followed by market selection, and finally investor expectations.

Keywords: *Investment behavior, decision factors, and investment performance*

BACKGROUND

The Taiwan stock market was established in February 1962, and at that time, comprehensive stock trading led the Taiwan capitalization weighted stock index to increase by nearly 6000 points. However, during the last 47 years, there have been tremendous changes. Before 1986, investment was not a common practice, and the economy and the Taiwan stock market experienced downturn; after 1986, due to rapid growth of the economy and corresponding increases in exports, domestic surplus capitals led to a bull market. In 1989, the market-share weighted index increased to 10, 000, and reached its record high of 12,682 in 1990. Most investors gained from stock investment at that time, but later, the economic bubble resulted in a sharp decrease of the Taiwan stock market index, and in 1991, the market-share weighted index decreased to 3000, and most investors who stayed in the market lost all their investment. Still, investors wanted to maintain/get back their initial investment and to improve their performance from the stock market (Miao, 2002).

From 2007 till now, the sub-prime mortgage crisis and bankruptcy of Lehman Brothers resulted in the most serious financial crisis in the past century, said Former Federal Reserve Chairman Alan Greenspan. Investors were regretful of cashing out their investments before the crisis. Is there any investment analysis method to assist investors to manage the stock market movement to minimize investors' loss or even gain from the stock market? Yet, studies on discussing effects on investor behavior and decision factors towards investment performance on the stock market are

limited, which is the motivation for this study. Hence, the purposes of this study in summarize are to measure:
1.Effects on variable of investors' background towards investment performance of Taiwan the stock market.
2.Effects on investors' behaviors towards investment performance of the Taiwan stock market.
3.Effects on decision factors towards investment performance of the Taiwan stock market.

LITERATURE REVIEW

Studies on investors

Investors in the Taiwan stock market are categorized into six different types according to their characteristics:
1.Foreign Direct Investment
2.Security Investment Trusts
3.Institutional Traders
4.Board of Supervisors/Directors of publicly listed companies (also referred to as Insiders)
5.Main Investor, who holds several hundred millions of investment, also referred to as market traders/outsiders
6.Individual Investor, whose invested amount is within several millions. (Taiwan Stock Exchange Regulation, 2009)

Studies on Investment Hehavior

Definition of investment behavior

Investment behaviors are defined as how the investors judge, predict, analyze and review the procedures for decision making, which includes investment psychology, information gathering, defining and understanding, research and analysis. The whole process is "Investment Behavior" (Slovic, 1972; Alfredo and Vicente, 2010). In this paper this definition is adopted.

Market Selection

The key point for selecting investment behaviors, selections of market or strategy regardless is the relation between returns and risks; which is to select investment targets with good credibility, large company size, high dividends, and high returns. However, high returns usually come with high risks; hence, the ultimate target for the investor is to select investments that balance risks and returns (Peng, Yu-Jan, 2003).

Selecting Strategy

Definition of strategy: Strategy was firstly used in the military; originally from Greek, " strategos", meaning commander or commanding skills. After discovery of game theory, strategy was then applied; the concept has been rapidly developed even after 1960. Chandler (1962) believed strategy decides long-term corporate goals, action plans and resource allocation to reach this goal. Another scholar, Kotler (1976) thought strategy is a whole picture design for companies to reach the planned strategy, which is also an integrated action plan for marketing, finance and manufacturing. Burnie and Ridder (2010) show that investors, individuals as well as corporations, use simple passive investment strategies and hence do not believe in market timing or wish to risk capital on capturing far tail or swan-type returns.

The strategy selections discussed in this paper are the expected returns or weighted investment capital of short-term, mid-term, and long-term strategy. It also discusses correlation between choosing trade strategy and investment performance. In the definition of general strategy selection and investment holding period, long-term investment means to hold the investment for more than 1 year, mid-term investment is for 3 months to 1 year while short-term investment is to hold less than 3 months. As regards to investment returns in long-term, mid-term and short-term trading, trading cost is the key factor.

Studies on Investment Decision factors

Investment decision

Fahlenbrach (2009) research " Founder-CEOs, Investment Decisions, and Stock Market Performance" and the implications of the investment behavior and stock market performance of founder-CEO firms are discussed.

Culters, Poterba & Lawrence (1989) believed decision-making is a baffling phenomenon. The common analytical methods in practices are categorized into fundamental, technical, traded volume and political factors. Precious and excess information sometimes leads to inconsistent decisions. This study also believed investors' psychology and expectations are also key factors to investment performance.

The above mentioned papers increase our study's subject matters as they are related to our research subject.

Definition of Fundamental Factors

"*Security Analysis*" by Benjamin Graham and David Dodd (1934) is used to decide intrinsic value of stocks based on studying factors of economy situations, industry trend and sales revenues of those companies. It focuses on long-term analysis, which is referred to as fundamental analysis. Benjamin Graham is also the Father of fundamental analysis.

Definition of Technical Analysis

Technical analysis originated from Sakata Strategy, developed by a rice trader, Homma Munehisa in the 19th century that was originally applied to the rice futures exchange market in Japan. Since then, it has gradually developed, with market experiences, innovations and development into the Candlestick Chart. The Candlestick chart is a style of bar chart used primarily to predict price movement of financial markets. In the early 19th century, other technical analysis was developed, such as Dow Theory. Dow Theory derived from Wall Street Journal editorials written by Charles H. Dow, founder of the Wall Street Journal during 1900 to 1902. Following his death in 1902, William Peter Hamilton summarized his articles and organized them into "*The Stock Market Barometer*" in 1922. After "*The Dow Theory*" was redefined and expanded in 1932 by Robert Rhea, the Dow Theory then had a completed framework. Dow Theory takes average indices of the Dow Jones Industrial Average and DJRA to determine business cycles that signal business activities. Other technical analytical theories like Wave Theory, RSI, KD, MA, MACD, and OBV were developed in the 20th century.

Definition of Psychological Factor

Psychology studies how minds work which originally means the study of mind. Psychologists discuss how human learn, think, and communicate; experiencing emotions and dealing with information for decision-making factor, and how these become core concepts to individual behaviors. All those actions would affect investment behaviors, and our decisions are the result of correlations between emotion and cognition regardless of being right or wrong. Psychological analysis of the stock market is to drive understanding of how psychology affects stock prices and market behavior. (Du, Jing-Long, 2007).Most investors ignore objective data, and are influenced by news from mass media; they buy stocks when price is high, and sell stocks when prices decrease sharply. This "buy high and sell low" behavior might not occur when investors are making decision individually without surrounding interference.

Definition of Macroeconomic Factor

Macroeconomics plays an important role by affecting financial investment decisions that lead to price movement. There are system risk and non-system risk of stock price movements. Non-system risks are derived from specialty of individual assets that could be eliminated from diversified investment portfolios. System risks are factors from macroeconomic and political environment that are unable to be eliminated by diversifying investments. Among all macroeconomic factors, especially price movements in capital markets, such as interest rates, exchange rates, CPI, and economic strategy signals would lead to a certain level of impact to on stock prices (Miao, Yan-Yang, 2002).

Studies on Investment Performance

In this paper we define that performance is an important signal to measure the achievement of organizational goals. In investment performance, Sharp proposed the "capital asset evaluation model" in 1964, which assumes that risk-averse investors expect highest returns; and investors are measuring risks with standard deviation of rate of returns (Liu, Ping-wen, 1993). Investors have homogeneous expectation of a rate of returns, which is expected as normal

distribution. There is also a risk-free rate in the capital market while an investor would expect an absolutely risk-free investment over a specified period of time. Capital market is also referred to as a perfect market, where there is no tax, regulation, information cost, trading cost and assets could have unlimited divisions (no restriction on selling/buying stocks).

Many papers concerning investment performance were published. Examples are Grauer (2010) evaluates historic, Bayes-Stein, Capital Asset Pricing Model and dividend-yield risk-free-rate estimators of asset means using statistical and economic criteria and shows that when combined with a discrete-time power-utility portfolio selection model, all the estimators generated from traditional CAPM estimator perform the worst. For the most part, commonly accepted statistical measures of investment performance support these rankings; Cornell (2009) presents a simple procedure for assessing the relative impact of luck and skill in determining investment performance and shows that the results are performance is due to random noise; Biais and Weber (2010) research "Hindsight Bias, Risk Perception, and Investment Performance" and they find that hindsight bias reduces volatility estimates and more biased agents have lower performance; Lyn and Zychowicz (2010) study "The Impact of Faith-Based Screens on Investment Performance". They find the evidence that faith-based funds mostly outperform the market and get the results that faith-based funds do better than socially responsible investing funds in general; Choe and Ecm (2009) research "The disposition effect and investment performance in the futures market", one of their findings shows that there is a negative relationship between the disposition effect and investment performance.

Research Method

Research Framework

Based on research motivation, and literature reviews, investors' background has significant differences to investment behaviors and decision factors, while investment behaviors and decision factors are strongly related to investment performance of the Taiwan stock market. The research framework is shown in Figure 3-1.

Figure 3-1: Research Framework

Research Methodology and Research Object

This study used SPSS for Windows to process data according to the research motivations and research framework. The data was processed by statistical analysis that includes descriptive statistics, One Way ANOVA, Pearson product-moment correlation, and regression analysis. The research objects are investors in the Taiwan stock market. Two Hundred questionnaires were sent to investors by adopting Purposive Sampling, 191 questionnaires were returned to complete with 1 ineffective questionnaire; the effective reply rate was 95%.

DATA EXPLANATION AND ANALYSIS

Background Description of Data

The gender distribution of 190 investors is shown in Table 4.1.

Table 4.1: Gender distributions

Gender	Male	Female
Number of people	68	122
Percentage (%)	35.8%	64.2%

Source: data from this study

Backgrounds of 190 investors are shown in Table 4.2.

Table 4.2 :Distribution of investors' backgrounds

Variables	Most distributed variables	Number of People	Percentage (%)
Age	36 to 45	83	43.7%
Marital status	Married	146	76.8%
Education	College/University	135	71.1%
Occupation	Financial Industry	132	69.5%
Position	Entry level officer	65	33.7%
Individual Annual Income	400,000 to 1,000,000	115	60.5%
Average quarterly investment	Under 1,000,000	147	77.4%
Assets	Under 1,000,000	87	45.8%

Source: data from this study

Examining Assumption for no Significant Differences Among Background Variables of Investors

Assumption of background variables effects on investment behavior and decision factor to investment performance is verified with One Way ANOVA for whether there is significant difference. Hypothesis 1(H1): Investors' background has no significant difference to investment behavior and decision factors. From Table 4.3, we found $H_{1\text{-}1}$: Investors' background has no significant difference to investment behavior and decision factors; however, assets of investors do have significant difference to market selection as F=1.943, P=.032. Other variables like gender, age, marital status, education, occupation, position, income and average quarter investment have no significant differences. Therefore, Hypothesis 1-1 ($H_{1\text{-}1}$) is not supported as investors' assets have significant difference to market selection; whereas Hypothesis 1(H1) is supported for all other variables having no significant differences to strategy selection in investment behavior.

Table 4.3: Effects on investors' background to market selection of investment behavior

		Sum of squares	Degree of freedom	Average sum of squares	F test	Significance level
Assets	Between	35.550	12	2.963	1.943	.032
	Within	269.902	177	1.525		
	Sum	305.453	189			

$^{**}P<.01$；$^{*}P<.05$

Source: data from this study

From Table 4.4, we found that $H_{1\text{-}2}$: There was no significant difference between investors' background to decision factors. Investors' background variables, including age, education, employment position, income, average quarterly investment and assets have significant differences to fundamental factors in decision-making as F=3.327, *P*=.000; F=1.952, *P*=.027;F=2.473, *P*=.004;F=2.900, *P*=.001;F=4.4448, *P*=.000;F=6.846, *P*=.000. However, other variables such as gender, marital status, and occupation have no significant differences. Hence, $H_{1\text{-}2}$ is not supported. Significant differences are found in fundamental factors in decision-making, such as age, education, employment

position, income, average quarterly investment and assets, while individual gender, marital status, and occupation have no significant difference to fundamental factors in decision-making, that H_1 is supported.

Table 4.4: Effects on investors' background to fundamental factors in decision-making

		Sum of squares	Degree of freedom	Average sum of squares	F test	Significance level
Age	Between	34.494	13	2.653	3.327	.000
	Within	140.374	176	.798		
	Sum	174.868	189			
Education	Between	9.046	13	.696	1.952	.027
	Within	62.748	176	.357		
	Sum	71.795	189			
Employment position	Between	184.670	13	14.205	2.473	.004
	Within	1010.825	176	5.743		
	Sum	1195.495	189			
Individual income	Between	22.700	13	1.746	2.900	.001
	Within	105.979	176	.602		
	Sum	128.679	189			
Average quarterly investment	Between	37.145	13	2.857	4.448	.000
	Within	113.066	176	.642		
	Sum	150.211	189			
Assets	Between	102.587	13	7.891	6.846	.000
	Within	202.866	176	1.153		
	Sum	305.453	189			

$^{**}P<.01$；$^{*}P<.05$

Source: data from this study

From Table 4.5, we found that $H_{1\text{-}2}$: There was no significant difference between investors' background to decision factors. Investors' background variables, including age, average quarterly investment and assets have significant differences to technical factors in decision-making as F=3.116, *P*=.000; F=4.075,*P*=.000; F=4.456, *P*=.000. However, other variables such as gender, marital status, education, occupation, position, and income have no significant differences. Hence, $H_{1\text{-}2}$ is not supported. Significant differences are found in technical factors in decision-making, such as age, average quarterly investment and assets, while individual gender, marital status, education, employment position, income, and occupation have no significant differences to technical factors in decision-making, that H_1 is supported.

Table 4.5: Effects on investors' background to technical factors in decision-making

		Sum of squares	Degree of freedom	Average sum of squares	F test	Significance level
Age	Between	34.896	14	2.493	3.116	.000
	Within	139.973	175	.800		
	Sum	174.868	189			
Average quarterly investment	Between	36.927	14	2.638	4.075	.000
	Within	113.284	175	.647		
	Sum	150.211	189			
Assets	Between	80.266	14	5.733	4.456	.000
	Within	225.186	175	1.287		
	Sum	305.453	189			

$^{**}P<.01$；$^{*}P<.05$

Source: data from this study

From Table 4.6, we found that $H_{1\text{-}2}$: There was no significant difference between investors' background to decision factors. Investors' background variables, including age, average quarterly investment and assets have significant differences to psychological factors in decision-making as F=2.046, *P*=.007; F=3.665,*P*=.000; F=5.311, *P*=.000. However, other variables such as gender, marital status, education, occupation, position, and income have no

significant differences. Hence, $H_{1\text{-}2}$ is not supported. Significant differences are found in psychological factors in decision-making, such as age, average quarterly investment and assets, while individual gender, marital status, education, employment position, income, and occupation have no significant difference to psychological factors in decision-making, therefore H_1 is supported.

Table 4.6: Effects on investors' background to psychological factors in decision making

		Sum of squares	Degree of freedom	Average sum of squares	F test	Significance level
Age	Between	35.608	21	1.696	2.046	.007
	Within	139.260	168	.829		
	Sum	174.868	189			
Average quarterly investment	Between	47.198	21	2.248	3.665	.000
	Within	103.013	168	.613		
	Sum	150.211	189			
Assets	Between	121.877	21	5.804	5.311	.000
	Within	183.575	168	1.093		
	Sum	305.453	189			

$^{**}P<.01$；$^{*}P<.05$

Source: data from this study

From Table 4.7, we found that $H_{1\text{-}2}$: There was no significant difference between investors' background to decision factors. Investors' background variables, including average quarterly investment and assets have significant differences to macroeconomic factors in decision-making as F=2.355, *P*=.001; F=3.744,*P*=.000. However, other variables such as age, gender, marital status, education, occupation, position, and income have no significant differences. Hence, $H_{1\text{-}2}$ is not supported. Significant differences are found in psychological factors in decision-making, such as average quarterly investment and assets, while individual age, gender, marital status, education, employment position, income, and occupation have no significant difference to macroeconomic factors in decision-making, thereforeH_1 is supported.

Table 4.7: Effects on investors' background to macroeconomic factors in decision-making

		Sum of squares	Degree of freedom	Average sum of squares	F test	Significance level
Average quarterly investment	Between	38.321	24	1.597	2.355	.001
	Within	111.890	165	.678		
	Sum	150.211	189			
Assets	Between	107.692	24	4.487	3.744	.000
	Within	197.761	165	1.199		
	Sum	305.453	189			

$^{**}P<.01$；$^{*}P<.05$

Source: data from this study

Investors' background variables, including average quarterly investment and assets have significant differences to macroeconomic factors in decision-making as F=2.355, *P*=.001; F=3.744,*P*=.000. However, other variables such as age, gender, marital status, education, occupation, position, and income have no significant differences. Hence, $H_{1\text{-}2}$ is not supported. Significant differences are found in psychological factors in decision-making, such as average quarterly investment and assets, while individual age, gender, marital status, education, employment position, income, and occupation have no significant difference to macroeconomic factors in decision-making, so H_1 is supported.

Hypothesis $H_{1\text{-}3}$: There was no significant difference between investors' background to decision factors. We found investors' age, gender, marital status, education, occupation, position, income, average quarterly investment and assets have no significant differences in market and strategy selection of investment behavior; thus, $H_{1\text{-}3}$ is supported.

Hypothesis $H_{1\text{-}4}$: There was no significant difference between investors' background to decision factors. We found investors' age, gender, marital status, education, occupation, position, income, average quarter investment and assets have no significant differences in fundamental, technical, psychological and macroeconomic factors in decision-making; thus, $H_{1\text{-}4}$ is supported.

Hypothesis of no Significant Differences in Pearson Product-Moment Correlation

Pearson Correlation Coefficient is applied to examine hypothesis of impact and correlations on investment behavior and decision factors to investment performance, and whether there is significant correlation between investment behavior and decision factors to investment performance.

Hypothesis 2 (H_2) : Investment behavior has no significant difference to investment performance

Results of Pearson Correlation Coefficient analysis as shown in Table 4.8, there is significant correlation between strategy selection of investment behavior and investment performance(r=.040, $P<.05$). When deciding investment target, investors would consider dividends (cash or stock), length of investment (short-term, mid-term, long-term) and capital allocations. In a bull market, investors with higher investments gain more; but in a bear market, investors gain in reducing investment and holding more cash for the next investment opportunities. This explains how strategy selection and capital allocation plays a key role. Therefore, $H_{2\text{-}2}$ is not supported as significance found in strategy selection of investment behavior, whereas $H_{2\text{-}1}$ is supported, as there is no significance in market selection of investment behavior.

Table4.8: Correlation between strategy selection of investment behavior and investment performance

		Sum of strategy selection
SUM of Investment performance	Pearson correlation significance (2-tailed)	.040

**When significance level is 0.01(2-tailed), significant correlation is found.
* When significance level is 0.05(2-tailed), significant correlation is found.
Source: data from this study

Hypothesis H_3: There is no significant correlation between decision factors to investment performance.Results of Pearson Correlation Coefficient analysis revealed as Table 4.9, there is significant negative correlation between fundamental and technical factors of decision and investment performance(r=-.006; r=-.41, $P<.01$, $P<.05$).Negative correlation is found between fundamental and technical factors to investment performance. Investors, who adopted fundamental and technical methods such as Dow's theory, wave, average movement, trend line theory, RSI, KD, MA and MACD, to analyze buying or selling signals of stocks in 2007 to 2008 or till now, lost their money. This suggests that in a bear market, no matter whether fundamental or technical analyses are applied, mostly negative performance in investment is derived. Hence, $H_{3\text{-}1}$ and $H_{3\text{-}2}$ are supported, and significance is found in significant negative correlation in fundamental and technical factors of decision factors. $H_{3\text{-}3}$ and $H_{3\text{-}4}$ are supported as no significant correlation is found in psychological and macroeconomic factors of decision factors.

Table 4.9: Correlation between fundamental and technical factors of decision factors, and investment performance.

		Sum of fundamental factors	Sum of technical factors
SUM of Investment performance	Pearson correlation significance (2-tailed)	-.006	-.041

**When significance level is 0.01(2-tailed), significant correlation is found.
* When significance level is 0.05(2-tailed), significant correlation is found.
Source: data from this study

From Table 4.10, we found fundamental factors have significant correlations to technical, psychological, macroeconomic factors, market selections, strategy selections, whereas they are significantly negatively correlated to investment performance. Strategy selection is significantly correlated to fundamental, technical, psychological, and macroeconomic factors, market selection and investment performance.

This suggests the investment behavior is correlated to fundamental, technical, psychological, and macroeconomic factors of investment decision-making while fundamental factors and technical factors are negatively correlated to investment performance. Current stock market investors and those of 2007-2008 were losing their money no matter which analysis methods (fundamental or technical) they applied, which stocks they selected (higher dividends, or cash

returns), length of investment (short-term, mid-term, long-term), and capital allocation. Investors' strategy selection of their investment behavior is positively correlated to investment performance. This suggests that in the bull market, investors who have higher amounts of investment would gain from the stock market; on the other hand, in the bear market, investors who have more cash on hand waiting for the next investing opportunity would be likely to gain. As a result, strategy selection and capital allocation is important.

Table 4.10: Correlation between Investment behavior and decision factors to investment performance

		Sum of fundamental factors	Sum of technical factors	Sum of psychological factors	Sum of macroeconomic factors	Sum of market selection	Sum of strategy selection	Sum of investment performance
Funda-mental factor sum	Pearson correlation	1	.407(**)	.235(**)	.331(**)	.453(**)	.269(**)	-.006
	significance (2-tailed)		.000	.001	.000	.000	.000	.940
		190	190	190	190	190	190	190
Technical factor sum	Pearson correlation	.407(**)	1	.149(*)	.252(**)	.355(**)	.292(**)	-.041
	significance (2-tailed)	.000		.040	.000	.000	.000	.399
		190	190	190	190	190	190	190
Strategy selection sum	Pearson correlation	.269(**)	.292(**)	.398(**)	.411(**)	.291(**)	1	.137
	significance (2-tailed)	.000	.000	.000	.000	.000		.040
		190	190	190	190	190	190	190

**When significance level is 0.01(2-tailed), significant correlation is found.
* When significance level is 0.05(2-tailed), significant correlation is found.
Source: data from this study

Regression Analysis

Regression analysis result of impacts on investment behavior and decision factors to investment performance is revealed in Table 4.11. As shown in the model summary, R^2=.319, and adjusted R^2=.301, that suggests the explain degree of impact on investment performance by 6 variables: market selection, fundamental factors, technical factors, psychological factors, macroeconomic factors and strategy selection is 31.9%, which is to say these 6 variables have 31.9% level of influence on investment performance.

Table 4.11: Summary of regression model

Multiple correlation coefficients	R^2	Adjusted R^2
.346	.319	.301

Dependent Variable: sum of investment performance (of Taiwan stock market) sum
Predictors: sum of fundamental factors, sum of technical factors, sum of psychological factors, sum of macroeconomic factors, sum of market selection, sum of strategy selection
Source: data from this study

An impact on investment behavior and decision factors to investment performance is shown in Table 4.12. We can see from ANOVA analysis summary table, when F=2.754, significance is .048, which means this model is acceptable.

Table 4.12: Regression analysis: ANOVA

	Sum of squares	Degree of freedom	Average sum of squares	F test	Significance level
Residual	22.704	15	1.514	2.574	.048
	167.296	174	.961		
Sum	190.000	189			

Dependent Variable: sum of investment performance (of Taiwan stock market)
Predictors: sum of fundamental factors, sum of technical factors, sum of psychological factors, sum of macroeconomic factors, sum of market selection, sum of strategy selection
Source: data from this study

The regression model coefficient of impacts on investment behavior and decision factors to investment performance is shown in Table 4.13. According to the result of regression coefficient, we built a regression formula with non-standardized coefficient, where beta values of regression coefficient are .174, .909, -.190, -.143, .070, and .193. Hence the regression formula is:

Y=.174market selection+.090strategy selection − .190fundamental factors − .143 technical factors +.070psychological factors+.193macroeconomic factors. In columns of significance of beta coefficient, we can see that psychological factors and strategy selection are not significant.

Table4.13: Regression Coefficient

	Standard coefficient		Degree of freedom	F test	Significance level
	Beta	Standard Deviation			
sum of market selection	.174	.080	3	4.709	.003
sum of strategy selection	.090	.079	3	1.292	.279
sum of fundamental factors	-.190	.081	2	5.514	.005
sum of technical factors	-.143	.085	3	2.843	.039
sum of psychological factors	.070	.078	2	.805	.449
sum of macroeconomic factors	.193	.075	2	6.516	.002

Dependent Variable: sum of investment performance (of Taiwan stock market)
Source: data from this study

Regression coefficient model and tolerance level of impacts on investment behavior and decision factors to investment performance is shown in Table 4.14. Adjusted tolerance level is approaching 1, where value of VIF (variance inflation factors) is comparatively low, which suggests there is no collinearity problem among all variances.

Table 4.14: Regression coefficient and level of tolerance

	Coefficient			Importance level	Tolerance level	
	Zero order	Partial Correlation	Partial		After adjustment	Before adjustment
sum of market selection	.090	.162	.154	.132	.784	.692
sum of strategy selection	.125	.086	.081	.094	.802	.741
sum of fundamental factors	-.154	-.175	-.167	.244	.772	.705
sum of technical factors	-.086	-.127	-.120	.102	.703	.771
sum of psychological factors	.135	.068	.064	.079	.827	.694
sum of macroeconomic factors	.216	.190	.182	.348	.889	.630

Dependent Variable: sum of investment performance (of Taiwan stock market)
Source: data from this study

CONCLUSIONS AND SUGGESTION

Research Conclusions

Regarding the hypothesis that there exists no significant difference to investment behaviors and decisions among the different investor background variables:

We found that investors with various asset levels do show a significantly different preference to market selection. This suggests investors would prefer to make investment among the companies with high credibility, larger in size, high cash/stock dividends and high stock price (3H stocks) or high risk with high return. On the other hand, the investor background variables cast no significant difference in investment behaviors, which suggests that strategy selection is less of a consideration for the investors.

Impacts on investment behavior to investment performance:

There is significant correlation between strategy selection to investment performance. This suggests when buying stocks, investors would choose companies with higher cash/stock dividends, as well as invest in short/mid/long term stock with adequate capital allocation. In a bull market, investors with higher amounts of investment have multiple gains; whereas in a bear market, investors with more cash for the next investing opportunity would likely gain. That indicates strategy selection and capital allocation play important roles. On the other hand, market selection has no significant correlation to investment performance, which indicates that market is not the factor when buying/selling stocks.

Impacts on decision factors to investment performance:

There is significant correlation between strategy selections to investment performance. This suggests when buying stocks, investors would choose companies with higher cash/stock dividends, as well as invest in short/mid/long term stock with adequate capital allocation. In a bull market, investors with higher amounts of investment have multiple gains; whereas in a bear market, investors with more cash reserved for the next investing opportunity would likely gain. This indicates strategy selection and capital allocation play important roles. On the other hand, market selection has no significant correlation to investment performance, which indicates that investors are less concerned about the market selection when buying/selling stocks.

Management Suggestion

Stock market is not only the showcase of the economy, but it is also the economic cycle's leading indicator. In 2007, the Taiwan stock market dropped more than 5000 points in just a few months, owing to the financial tsunami just started. This brought the Taiwan stock market into a real bear market. Most interviewees of this questionnaire were investors with negative results at that time, very few investors (from various age, education, occupation, income, average quarterly investment, assets level) made significantly different market selection and decision factors despite varying backgrounds. Investment behaviors and decision factors are not significantly correlated to investment performance.

From this research result, we concluded that only investors with the right strategy and investment behavior could make profit in this particular market scenario. This proved that in the bear market, regardless of the market fundamental, technical, psychological, macroeconomic factors, if investors can reduce their investments, and reserve more cash for re-investment at more reasonable stock price levels (i.e P/E Ratio =10), they shall yield positive results for investment performance in the long-term. In a bull market, investors with more cash for the investment would most likely to have multiple gains in their investment. Investment behavior and decision factors are significantly correlated to investment performance or the profitability level. In conclusion, this study suggests that in bear markets, stock prices of well-managed and poorly managed companies would both enter a price correction phase simultaneously. The best way to keep the investment value level at this point is to reduce stock holdings and set a "stop-loss" point.

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