

Dissection of Investor Sentiments: Evidence from Taiwan

Askar Koshoev
Department of Accounting, Chung Yuan Christian
University

— *Review of* —
**Integrative
Business &
Economics**
— *Research* —

ABSTRACT

In comparison with previous studies focused on a single investor sentiments indicator, this study separates investor sentiments into two levels. First-level sentiment index represents sentiments of investors for a particular stock, while the second-level index is characterized by trends on the general market. In addition, the stock-level index is the two-step investor sentiments index, consisting of a non-rational variance of the stock returns and other proxies of investor sentiments. The results reveal that both indices are important factors in explaining current stock returns. The indices have a strong predictive power of forecasting future returns, however, the power of market-level sentiments diminishes as the forecasting range increases. The study constructs the indices based on the first principal components and employs panel regression analysis with the fixed effects. The sample consists of all stocks listed in Taiwan Stock Exchange and covers the period of ten years.

Keywords: Investor sentiments; Stock returns; TAIEX; Sentiment Index.

Received 12 October 2018 | Revised 2 February 2019 | Accepted 25 February 2019.

1. INTRODUCTION

The historical facts reveal that stocks may lose or gain investors' confidence even when a general condition on a whole market is not aligned with them. The total return on the stocks of Walmart for the year 2008 is 24.69 percent, while S&P 500 has lost 37 percent for the same period. This raises the question, if the global sentiments on the market are pessimistic (e.g. during a recession), do stocks which simultaneously appreciate are affected only by improvements in their fundamentals or some particular stocks induce optimism in investors' perceptions? If the first one is true, then investors should load on these stocks because like most of the average stocks they are undervalued during recessions and will generate even higher returns after it. In the second case, investors should carefully analyze stocks which are generating positive returns when the market is in decline, because of a probability that even in the phase of recession, some stocks may be overvalued.

The reasons why stock returns are not completely aligned with rational factors, such as analysis of firms' fundamentals, trends on the macroeconomic scales, factors of risks and growth, etc., were examined by numerous of scholars (Baker and Wurgler 2004; Brown and Cliff, 2004; Lee *et al.*, 1991; Swaminathan, 1996; Zweig, 1973.) They repeatedly documented that investor sentiments and future returns are negatively correlated, implying that optimism (pessimism) in stock valuations are associated with the negative (positive) future stock returns. The same void in the market efficiency theory

was discovered by some practical investors (e.g. Graham, 1965, Lynch 1989) who successfully exploited the gap between rational investments and speculations based on irrational beliefs.

Considering the inverse relationship of sentiments and future stock returns, the case described in the first paragraph of this section may lead to confusing situations. The previous studies were based on a single measurement of investor sentiments focused mostly on the sentiments on a general market. According to them, stocks are undervalued during a recession. On the other hand, assuming the existence of investor sentiments toward some particular stock which is independent of the sentiments on the market, some stocks may have inflated valuation even when most of the investors on the market are pessimistic.

Using the sample of all listed stocks on the Taiwan Stock Exchange (TWSE), this study makes an attempt to segregate investor sentiments into two independent indices which will attribute to stock-level and market-level sentiments. The balanced sample covers the period of full ten years starting from March of 2008 until March 2018 inclusively. The results suggest that while both of the indicators of investor sentiments on two different scales are significant factors of stock returns (current and future), they should be analyzed in separate as they have a different impact on the stock returns.

2. LITERATURE REVIEW

One of the main challenges of behavioral studies lies in the fact of difficulties of measuring investor sentiments. Existing studies can be divided into several distinct groups based on their approaches of quantifying investors' beliefs of stock perspectives. The first group of researchers measures investor sentiments by employing a single proxy which is expected to represent investor sentiments. Early studies in current field measured gauged investor sentiments by calculating the difference between market price and net asset value of the closed-end funds (Lee et al., 1991; Swaminathan, 1996; Zweig, 1973). The use of this proxy found support in the conclusions of Brown (1999) who asserts that sentiments were closely related to the closed-end fund price volatility. Other authors examined the practicality of a variety of variables using trading data (Clarke and Statman, 1998; Fisher and Statman, 2000; Otoo, 1999; Simon and Wiggins, 1999). Baker and Stein (2004) had considered employing NYSE turnover rate as the proxy. They explained their choice of the proxy as increased liquidity of the total stock market by the investors' irrational optimism. Baker and Wurgler (2000) used a ratio of equity issues over total capital funding. They proposed that the firms would seek new funds through issuing new stocks rather than increasing debt when a stock market was high and the opposite was true for the low market. A number and performance of initial public offerings (IPO) have also been studied by researchers (Ritter, 1991; Stigler, 1964). Assuming that firms and underwriters try to choose optimal timing for their IPOs in order to maximize the valuation of the stocks and the company. A potential problem with the employment of a single proxy is the possible disturbances caused by a vast spectrum of factors, such as a political environment, a global economy, development of technologies, etc.

Another group of researchers referred to the outcomes of surveys conducted by polling investors of different levels. Verma and Soydemir (2006) in their study of US sentiments used American Association of Individual Investors' survey as a proxy for

investor sentiments. In the similar research, Grossmann et al. (2007) utilized a proxy of combined three consumer sentiment surveys, conducted by the University of Michigan, University of Melbourne, and the European Commission respectively. To get direct opinions of institutional investors, Gao and Kling (2008) used Chinese Central Television Station survey in order to trace their optimistic views. Opponents of studies which are referencing to the polled data claim that there can be multiple serious drawbacks which do not allow the outcomes of studies to be reliable. They allege that the answers given by the investors may be different from their actions. An investor may think that she is optimistic about stocks while still hesitating to buy the stocks. Another critique is related to the representativeness of the samples.

The third group is represented by researchers who used more complex techniques to measure the sentiments. The proxies were obtained by constructing complex indices based on the first principal component of several indicators which may contain a common factor of investor sentiments (Brown and Cliff, 2004; Baker and Wurgler, 2006). A potential advantage of these indices is the ability to combine multiple investor sentiments proxies and to isolate some common factor which is assumed to be an accurate measurement of the sentiments.

3. METHODOLOGY AND VARIABLE DEFINITIONS

The basic idea of the separation of investor sentiments is the isolation of stock-related sentiments from the sentiments on the general market. It is expected to see different effects of these two sentiment indices on the stock returns. The primary hypothesis is that stock-related sentiments have a dominant effect on stock returns. In other words, even if sentiments on the general market are inverse to the sentiments toward a particular stock, the stock prices will move accordingly to the stock-related sentiments.

In order to control for other variables which theoretically have an explanatory power over stock returns, the study employs multiple variables which are expected to represent these factors. As indicated in Table 1, the factor of risk is represented by several variables on various levels. Beta serves as an indicator of systematic risk, while variables debt ratio, times-interest-earned, firm size, and dividend yield characterize stock issuer's default risk. Return-on-assets, assets growth rate, earnings growth rate, assets turnover ratio measure firms' operating performance and growth opportunities. Current ratio and stock turnover ratio indicate the liquidity of firms' assets and stocks. Returns on the major stock market index on TWSE, Taiwan Capitalization Weighted Stock Index (TAIEX) is based on all listed stocks on the exchange excluding preferred stocks and stocks listed less than a month. The macroeconomic environment is specified by such factors as inflation (consumer price index and currency exchange rate), industrial production rate (industrial output), and interest rate based on the government's short-term borrowing rate. The last two columns of Table 1 demonstrate expected signs of corresponding coefficients and their brief explanations.

Because of different periodic at which the data is being disclosed to the public, the research will combine monthly and quarterly variables as they are available to investors by a certain date. For example, by July of each year, an investor has an access to current macroeconomic indicators as well as to corporate financial reports of the second quarter. By August, investors can update their perspectives on certain stocks based only on news

from updated macroeconomic and market records, while still basing the fundamental analysis on the two-month-old corporate financial statements.

Table 1. Variables definition

#	Variable	Definition	Factor	E(+/-)	Comment
1	BETA	Beta based on trailing twelve-month data	Risk	-	High risk - low returns
2	DEBT	Debt ratio = Total liabilities / Total assets	Risk	-	High risk - low returns
3	TIE	Times-interest-earned	Risk	+	The higher the interest coverage rate the lower the risk
4	SIZE	=Ln(Total assets)	Risk	+	Bigger firms less risk
5	Yield	Dividend Yield	Risk	+/-	High yield stocks might be preferable for conservative investors
6	ROA	=Net income/Total assets	Performance	+	Higher profitability the higher stock valuation
7	TAG	=Total assets/ Total assets _(t-1)	Performance	+	Higher growth the higher returns
8	EPSG	EPS/EPS _(t-1)	Performance	+	Higher growth the higher returns
9	TATURN	Total assets turnover ratio	Performance	+	Higher firm efficiency the higher returns
10	CUR	Current Ratio	Liquidity	+/-	Investors prefer firms with optimal liquidity
11	STURN	Turnover ratio of traded stocks	Liquidity	+	Liquidity of stocks is preferable
12	MRET	Returns on TAIEX	Macro	+	Indicator of general climate on the stock market
13	CPI	=CPI/CPI _(t-1)	Macro	+	Stocks are expected to grow in price as general prices grow
14	FX	=(NTD/USD)/(NTD/USD) _(t-1)	Macro	-	Depreciating currency might signify about macroeconomic climate in the country
15	IO	Total industrial output	Macro	+	The growth of industrial output is expected to serve as a proxy for economic development
16	RF	Risk-free rate	Macro	+	According to the CAPM, the growth of risk-free rate is supposed to increase the required return rate.
17	SRET	Stock Returns			Dependent variable

The source of data is the Taiwan Economic Journal (TEJ) Database. Unless the computations are not indicated in the 'Definition' column, the data variable is employed in the form as it was acquired from the TEJ database. The stock market and macroeconomic variables are collected on the monthly basis, while corporate data are presented only as quarterly data. The sample covers a period of full ten years starting from March 2008 until March 2018 inclusively.

In order to build a two-level stock-related sentiment index, the stock returns will be regressed on all variables which are expected to explain the variance of the former. As demonstrated in Equation 1, the residual of the regression will be extracted as unexplained part of the stock returns. While this residual consists of a great number of factors (trades based on insiders' information, untraceable patterns, etc.), it is anticipated that some of them can be linked to investors' beliefs on the stocks' future performance. Considering that the results of the regression in Equation 1 and associated coefficients are not directly connected to the study, the table comprising this information is disclosed in Appendix I.

$$SRET_{i,t} = \alpha_1 + \alpha_2 BETA_{i,t} + \alpha_3 DEBT_{i,t} + \alpha_4 TIE_{i,t} + \alpha_5 SIZE_{i,t} + \alpha_6 YIELD_{i,t} + \alpha_7 ROA_{i,t} + \alpha_8 TAG_{i,t} + \alpha_9 EPSG_{i,t} + \alpha_{10} TATURN_{i,t} + \alpha_{11} CUR_{i,t} + \alpha_{12} STURN_{i,t} + \alpha_{13} MRET_{i,t} + \alpha_{14} CPI_{i,t} + \alpha_{15} FX_{i,t} + \alpha_{16} IO_{i,t} + \alpha_{17} RF_{i,t} + SRSD_{i,t} \quad (1)$$

where α_1 – intercept, variables are assigned accordingly as in Table 1 and $\alpha_2 \sim \alpha_{17}$ coefficients of respective variables for firm i at period t , $SRSD$ – residual.

Addition of the residual of the above-demonstrated regression to the other variables which are commonly used by contemporary scholars for measuring investor sentiments

and identifying their first principal component results in the construction of two-step sentiments index. The model of the index is demonstrated in Equation 2. Building sentiments index based on the principal components is widely used and well-demonstrated by Baker and Wurgler (2006) and Brown and Cliff (2004). The quotient of a stock's price-to-book ratio on TAIEX's price-to-book ratio (SPB) shows how investors perceive individual stock's perspectives in comparison with the general market. The value above 1 indicates that the investors are optimistic about the stock. Similarly, the quotient of a stock's price-to-earnings ratio on TAIEX's price-to-earnings ratio (SPE) measures a difference of individual valuation against average valuation across the whole market. If investors believe that a particular stock possesses higher growth opportunities or lower risk factors in comparison with alternatives on the market, they will tend to value the stocks of the firm above the market average. Both SPB and SPE serve as the indicators of investors beliefs concerning improvements of firm's future performance, while stocks' turnover ratio (STRN) and stocks' trading volume (SVOL) reflect a vision of the traders on the results of the stocks' technical analysis. The market liquidity factors represented by stock trading volumes and stock turnover ratio are associated with sentiments on stock markets (Baker and Wurgler, 2007). Similar to the aforementioned sentiment proxies, STRN and SVOL are designed to measure stock-related sentiments in isolation to common sentiments on the market. Finally, the SRSD is a variable which derives from the regression of stock returns on the fundamental and macroeconomic variables and assumed to capture unexplained variance of the stock returns.

$$SSENTI_{i,t} = 0.327SPB_{i,t} - 0.031SPE_{i,t} + 0.030SRSD_{i,t} + 0.679STRN_{i,t} + 0.656SVOL_{i,t} \quad (2)$$

Eigenvalue of the first principal component = 1.515

Proportion of the index's variance explained by the first principal component = 30.30%

After construction of the stock-level sentiments index, the research proceeds by building the index related to sentiments on a greater scale, the market-level (Equation 3). The four proxies of investor sentiments are assumed to carry investor sentiments about the market in general. These include: Consumer Confidence Index (SCCI), Equity Share (SES), turnover ratio and trading volume of all stocks on the market (SMT and SVL respectively.) Consumer Confidence Index is a direct proxy for sentiments constructed by polling households' opinions about major economic perspectives through direct surveys. Following Baker and Wurgler (2006), this study adopts SES as an indirect measurement of investor sentiments. In times when general markets are dominated by optimism managers prefer to raise funds through emission of new stocks while times when a majority of investors are pessimistic and stocks are considered to be undervalued, managers prefer to finance firms' investment projects through debt instruments. For the same reason as with STRN and SVOL, SMT and SVL are expected to indicate general sentiments on the market through stock trading.

$$MSENTI_t = -0.551SCCI_t - 0.042SES_t + 0.712SMT_t + 0.433SVL_t \quad (3)$$

Eigenvalue of the first principal component = 1.794

Proportion of the index's variance explained by the first principal component = 44.85%

The last stage of the research is defined by building a model which tests each of the sentiments indices and investigates their effect on the stock returns. Model 1 and 2 will omit one of the indices from Equation 4 to test their effects separately and combine them in Model 3 to identify each indices' relationship with the stock returns in the whole set of

variables. Models 4 will add the interaction term of the indices to examine their combined influence. Finally, in Model 5, the study will test the forecasting power of indices by employing lagged terms of the indices.

$$SRET_{i,t} = \gamma_1 + \sum_{i,t} \gamma \text{FACTORS} + \gamma_{18} SSENTI_{i,t} + \gamma_{19} MSENTI_t + \varepsilon_{i,t} \quad (4)$$

where γ_1 – intercept, $\sum_{i,t} \gamma \text{FACTORS}$ represent the sum of all variables and respective coefficients assigned accordingly as in Table X for i firm at period t , $SSENTI$ – investor sentiments for an individual stock, $MSENTI$ – common investor sentiments on the market, $\varepsilon_{i,t}$ – residual.

4. RESULTS AND THE DISCUSSION

Due to the inclusion of multiple variables associated with the same factor, the first step will be testing all independent variables for multicollinearity problem. According to the results of Spearman's correlation matrix (Table 2), there is no correlation problem exist across the sample with the highest correlation (-0.367) between Debt ratio and Times-interest-earned.

The highlights of control variables' descriptive statistics demonstrated in Table 3 include the mean and median of stock returns, market returns, the return of assets, total assets growth rate, and changes of consumer price index. Being above zero, they all signal that they have positive trends on the monthly basis. Distinct from 1, mean of Beta signals that the TAIEX is mostly affected by large firms which drive the market not equal to the average firms. The firms' assets are almost in half financed by debt (mean of debt ratio = 0.77), but they are well covered by the earnings (TIE = 85.53). Notice that the TIE, Yield, and RF are presented in percentage form in comparison with other variables which are used in decimals. The yield on the average stock is 3.96 percent which is almost twice larger than the rate of return on generally accepted to be risk-free assets (RF=1.8). Interestingly, the exchange rate of the US dollar on the New Taiwan Dollar is mostly constant (FX = 1) which may signify that the rate may be pegged. The mean value of the industrial output (IO=91.11) indicates that there are more periods observed before the index was set to 100. Overall, the balanced sample comprises of 79412 observations and covers a period from March 2008 to March 2018.

Table 2. Correlation Matrix for the Set of General Variables

	BETA	DEBT	TIE	ROA	MRET	SIZE	TAG	EPSG	TATURN	CUR	STURN	YIELD	CPI	IO	FX	RF
BETA	1.000															
DEBT	-0.008	1.000														
TIE	-0.016	-0.367	1.000													
ROA	0.024	-0.163	0.325	1.000												
MRET	-0.108	-0.026	0.007	-0.021	1.000											
SIZE	0.146	0.318	-0.094	0.089	-0.002	1.000										
TAG	0.030	0.091	0.087	0.253	-0.038	0.064	1.000									
EPSG	-0.002	-0.006	0.075	0.087	-0.018	0.018	0.079	1.000								
TATURN	0.021	0.158	0.080	0.182	-0.029	0.049	0.107	0.052	1.000							
CUR	-0.021	-0.209	0.078	0.016	0.007	-0.096	-0.022	-0.028	-0.092	1.000						
STURN	0.224	-0.054	0.038	0.075	0.096	-0.048	0.093	0.017	0.053	-0.015	1.000					
YIELD	-0.008	-0.051	0.119	0.186	-0.111	0.112	-0.004	0.014	0.158	-0.035	-0.096	1.000				
CPI	0.028	0.014	0.006	0.026	-0.151	0.002	0.041	0.018	0.006	-0.003	-0.024	-0.059	1.000			
IO	-0.117	0.027	0.010	0.021	-0.147	0.056	0.034	0.051	-0.038	0.005	-0.167	-0.091	-0.018	1.000		
FX	0.001	-0.003	-0.011	-0.016	0.038	0.001	-0.026	-0.007	-0.016	0.003	-0.012	0.098	-0.141	-0.021	1.000	
RF	0.032	0.017	-0.053	-0.034	-0.358	-0.020	-0.058	-0.039	0.037	-0.012	-0.055	0.259	-0.052	-0.235	0.128	1.000

Beta – Beta based on trailing twelve-month data; DEBT – Debt ratio; TIE – Times-interest-earned; SIZE – Firm’s size; Yield – Dividend Yield; ROA – Return on Assets; TAG – Total assets growth rate; EPSG – earning per share growth rate; TATURN – Total assets turnover ratio; CUR – Current Ratio; STURN – Turnover ratio of traded stocks; MRET – Returns on TAIEX; CPI – Inflation rate; FX – currency exchange rate; IO – Industrial output; RF – Risk-free rate.

Table 3. Descriptive Statistics for the Set of General Variables

	SRET	BETA	DEBT	TIE	ROA	MRET	SIZE	TAG	EPSG	TATURN	CUR	STURN	YIELD	CPI	IO	FX	RF
Mean	0.01	0.77	0.44	85.53	0.01	0.00	16.09	0.01	-0.08	0.22	2.35	10.92	3.96	0.07	91.11	1.00	1.80
Median	0.00	0.73	0.45	11.50	0.01	0.01	15.91	0.01	-0.14	0.19	1.72	5.94	3.64	0.12	93.40	1.00	1.88
Max	1.83	7.74	1.03	845.82	0.72	0.18	21.95	0.25	3.79	1.62	19.21	44.94	62.50	1.90	111.67	1.09	3.63
Min	-0.75	-6.48	0.01	-27.42	-0.95	-0.26	11.66	-0.17	-3.33	-0.55	0.09	0.61	0.00	-1.75	45.62	0.95	1.25
S.D.	0.12	0.68	0.17	206.29	0.02	0.05	1.39	0.06	1.49	0.15	9.34	12.11	3.83	0.64	12.81	0.01	0.57
Skew.	1.57	0.20	0.12	2.97	-3.56	-0.34	0.75	0.44	0.45	2.15	28.89	1.57	2.11	-0.05	-1.05	0.26	1.99
Kurt.	15.66	7.43	2.77	10.72	211.85	5.12	3.76	4.60	4.39	11.74	25.91	4.57	16.15	3.55	4.34	4.11	6.72
Obs.	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412	79412

TIE, TAG, EPSG, CUR, STURN, were winsorized at 5th and 95th percentiles.

Descriptive statistics of the components of associated with them sentiment indices are demonstrated in Table 4. Mean of SPB (0.99) suggests that the average firms' valuations are very close to the corresponding indicator of the market index. In comparison with SPB, a much larger variation of the price-to-earnings ratio among the sample is shown by SPE. Mean of SPE is different from one because the TAIEX is capitalization-weighted, meaning that the proportion of larger firms are bigger in the calculation of the index. This may be explained by a more conservative valuation of larger firms as they are less risky, have mediocre growth rate, and generate stable earnings (Baker and Wurgler, 2006). In addition, the largest firms in Taiwan are usually cross-listed in developed markets such as the US which leads to lower valuations of firms from speculative markets (Hu and Koshoev, 2017). Liquidity indicators show that while the average listed stocks are being traded more often (STRN 1.54) than the TAIEX, overall the volume of traded stocks are approximately one-quarter of the index. Close to zero mean of the residual term derived from the regression of stock returns proves that the set of control variables are properly chosen and sufficient for the analysis. A mean of SCCI with less than 100 coefficient signals that households on average are skeptical about future perspectives, which is opposite to the actions of managers according to the rate of new shares issuance. Although SMT and SVL are less informative but expected to play a significant role in detecting trends of sentiment over the period.

Table 4. Sentiment proxies and their descriptive statistics

	SPB	SPE	STRN	SVOL	SRSR	SCCI	SES	SMT	SVL
	Individual stock sentiment proxies					Market sentiments proxies			
Mean	0.99	2.20	1.54	0.26	0.00	75.94	0.02	2.08	11.37
Median	0.79	0.88	0.85	0.26	0.00	78.47	0.00	1.99	11.37
Maximum	11.23	532.10	53.80	0.70	1.69	92.93	7.01	3.20	11.92
Minimum	0.00	0.00	0.03	0.00	-0.77	48.42	-7.00	1.26	10.73
Std. Dev.	0.74	12.04	2.10	0.14	0.08	10.86	0.93	0.37	0.26
Skewness	3.82	22.68	4.75	0.04	1.10	-1.09	0.29	0.61	-0.25
Kurtosis	27.10	661.68	46.09	2.46	14.28	3.37	51.32	3.22	2.67
Observations	58358	58358	58358	58358	58358	92884	92884	92884	92884

SPB – price-to-book ratio of a stock divided on TAIEX price-to-book ratio; *SPE* – price-to-earnings ratio of a stock divided on TAIEX price-to-earnings ratio; *STRN* – turnover ratio of a stock (Trading volume/outstanding shares *100) divided on TAIEX turnover ratio; *SVOL* - trading volume of a stock divided on TAIEX trading volume; *SRSR* – residuals of regression model from Equation 1; *SCCI* – consumer confidence index; *SES* – new stocks issues divided on the sum of new stock and new debt issues; *SMT* – natural logarithm of TAIEX turnover ratio; *SMV* – natural logarithm of TAIEX trading volume.

Tables 5 demonstrates the correlation coefficients of employed investor sentiment proxies as well as the sentiment indices which are derived from the principal component analysis of the former. Analysis of the stock-related sentiment index does not reveal any significant correlations between its components. The highest correlation coefficient belongs to STRN and SVOL, which is reasonable because both of them are linked to the amounts of stock traded on the market. On the right side of the table, components of the market-level sentiment index demonstrate slightly higher correlations than stock-related components. High correlation of the reverse relationship of households' sentiments and sentiments of stock traders cannot be explained directly. That is another reason why both are considered to represent different types of investors and will not be eliminated from the index's computation.

Table 5. Correlation Matrix of Sentiment Proxies

	SSENTI components					MSENTI components					
	SPB	SPE	SRSD	STRN	SVOL	SSENTI	SCCI	SES	SMT	SVL	MSENTI
SPB	1	-0.014	0.030	0.053	0.023	0.190	0.005	-0.002	-0.001	0.006	-0.001
SPE		1	0.011	0.010	-0.023	-0.028	0.015	-0.011	-0.017	0.017	-0.010
SRSD			1	0.018	0.024	0.064	-0.012	0.003	-0.038	-0.057	-0.034
STRN				1	0.424	0.859	0.018	0.003	-0.007	0.027	-0.002
SVOL					1	0.840	-0.148	0.006	0.217	0.078	0.202
SSENTI						1	-0.060	0.005	0.106	0.056	0.099
SCCI							1	0.039	-0.632	0.032	-0.738
SES								1	0.018	-0.058	-0.057
SMT									1	0.503	0.954
SVL										1	0.580
MSENTI											1

The regressions list all the potential variables which are expected to control for the fundamental factors affecting the stock returns such as risk, firm performance, stock performance, and macroeconomic conditions. The results of the regressions are demonstrated in Table 6.

Model 1: The model reveals that stock-related sentiments have a significant and positive effect on the stock returns. It is consistent with the general logic implying that the stocks will be higher valued if they raise optimism in their investors.

Model 2: Unexpectedly, sentiments on the market level have a negative effect on the stock returns. Suggested explanation – during the times when investors are skeptical about the trends on the market in general, they turn their attention to some specific stocks.

Model 3: The model combines two sentiments indices and observes how the stock returns are influenced by them simultaneously. The results reveal that both sentiment indices are significant but their effects on the stock returns are opposite. In general, this model proves that attempt to isolate sentiments on two different levels was successful, moreover, the opposite signs in front of each coefficient imply that the phenomenon of sentiments should be observed and analyzed in separate.

Model 4: The model investigates the interaction term of two sentiment indices. The results show that both variables are important and when these two indices are observed together their impact is magnified. In comparison with the previous models which tested each of the sentiment indices in isolation, in this model the market-level sentiment index is positive. It is assumed that the strong stock-related sentiments attract market attention and lead to a positive valuation of the individual stock.

Model 5: In this model, the study attempts to test the sentiment indices on their prediction power. The results demonstrate that the variables are significant factors in forecasting future stock returns. The negative coefficients of both sentiment indices and even their interaction support the theory of reverse association of current sentiments and future stock returns (Baker and Wurgler, 2006; etc.) Multiple attempts to investigate the effect of the sentiments on the further stock returns, by increasing the prediction range, revealed that the market-level index has a diminishing forecasting power while the significance of the stock-related sentiments is persistent.

Table 6. Descriptive and predictive properties of the sentiment indices

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
C	0.427*** (11.81)	0.206*** (6.43)	0.449*** (12.25)	0.553*** (15.36)	-0.109*** (-3.03)
BETA	-0.019*** (-31.49)	-0.014*** (-26.52)	-0.019*** (-31.42)	-0.021*** (-34.63)	-0.008*** (-13.06)
DEBT	0.055*** (8.61)	0.039*** (7.86)	0.056*** (8.80)	0.068*** (10.74)	0.001 (0.22)
TIE	0.000 (-1.47)	0.000 (1.29)	0.000 (-1.47)	0.000** (-2.18)	0.000 (1.06)
ROA	0.189*** (6.23)	0.222*** (12.15)	0.193*** (6.38)	0.157*** (5.28)	0.431*** (14.77)
MRET	1.076*** (139.24)	1.086*** (142.02)	1.080*** (138.64)	1.077*** (141.12)	0.979*** (127.86)
SIZE	-0.038*** (-20.70)	-0.025*** (-18.04)	-0.039*** (-20.97)	-0.044*** (-24.50)	-0.006*** (-3.15)
TAG	0.013** (2.00)	0.016** (2.48)	0.014** (2.08)	0.011* (1.73)	0.027*** (4.12)
EPSG	0.002*** (8.51)	0.002*** (7.44)	0.002*** (8.53)	0.002*** (9.07)	0.002*** (6.08)
TATURN	-0.063*** (-8.77)	-0.035*** (-5.46)	-0.064*** (-8.80)	-0.070*** (-9.93)	-0.001 (-0.18)
CUR	0.000 (1.60)	0.000 (-0.33)	0.000 (1.53)	0.000 (0.46)	0.000 (-0.31)
STURN	-0.001*** (-15.07)	0.002*** (85.03)	-0.001*** (-13.45)	-0.003*** (-42.10)	0.003*** (112.09)
YIELD	-0.001*** (-9.06)	-0.002*** (-13.10)	-0.001*** (-9.22)	-0.001*** (-7.49)	-0.002*** (-18.37)
CPI	-0.001*** (-2.72)	-0.002*** (-4.26)	-0.002*** (-3.48)	-0.002*** (-4.09)	0.004*** (6.67)
IO	0.000 (1.09)	0.000 (-1.54)	0.000 (-0.94)	0.000** (2.39)	0.000*** (-5.05)
FX	0.200*** (8.42)	0.182*** (7.71)	0.194*** (8.19)	0.192*** (8.25)	0.186*** (8.11)
RF	0.005*** (6.92)	0.007*** (9.74)	0.005*** (7.05)	0.006*** (7.80)	0.005*** (6.99)
SSENTI	0.050*** (60.03)		0.049*** (58.06)	0.082*** (77.10)	
MSENTI		-0.005*** (-13.49)	-0.001*** (-3.63)	0.002*** (4.61)	
SSENTI*MSENTI				0.015*** (49.33)	
SSENTI _{t-1}					-0.039*** (-78.97)
MSENTI _{t-1}					-0.005*** (-14.05)
SSENTI _{t-1} *MSENTI _{t-1}					-0.007*** (-27.86)
SSENTI _{t-2}					
MSENTI _{t-2}					
SSENTI _{t-2} *MSENTI _{t-2}					
Adj. R ²	0.411	0.328	0.411	0.435	0.440
AIC	-2.140	-1.866	-2.140	-2.182	-2.208
Log likelihood	63193	74839	63200	64407	64016
Obs.	58358	79412	58358	58358	57321

The table represents the output of the six panel regression models with fixed effects. Each column displays the coefficient of the respective variable (*t*-statistics in parenthesis). ***, **, * - significance at 1%, 5%, 10% respectively. The bottom panel indicates goodness-of-fit represented by the adjusted R-squared, Akaike info criterion and log likelihood indicators. The number of observations per model concludes the output.

5. CONCLUSION

This study employed the panel regression models in order to analyze the effects of two distinctive investor sentiments indices on the stocks listed on the Taiwan Stock Exchange. The first index is considered to represent stock-level sentiments, the sentiments of investors toward a specific stock. The second sentiment index is designed to measure sentiments on the general market. Investigation of these relationships by dividing sentiment indicators into two levels allowed to trace the idiosyncratic effects of sentiments on different levels.

The results reveal that the sentiments on both levels have a significant effect on the stock returns. These do not change when they are tested in separate, together, and used to predict near future stock returns, however, the significance of the market-level sentiments diminishes with the higher range of forecasting. When the sentiment indices are tested in separate, stock-level sentiments and market-level sentiments have opposite correlation with the stock returns. This phenomenon holds even if both indices are tested in the same model. This finding serves as the proof that future studies should isolate each level of sentiments in order to properly analyze and interpret them.

Further investigation shows that the interaction of the indices augments their effect on the stock returns. The outcomes propose that the returns of the stocks might follow the direction given by the investors' sentiments who observe individual stock even in the times when the whole market has the opposite feelings about future perspectives of the market. Finally, the last test presented that both of indices have some predictive power over the future stock returns, and consistent with the numerous findings of previous scholars - the future stock returns are negatively correlated with current investor sentiments on both levels.

REFERENCES

- [1] Baker, M. and Stein, J.C. (2004), Market liquidity as a sentiment indicator. *Journal of Financial Markets*, 7(3), pp.271-299.
- [2] Baker, M. and Wurgler, J. (2000), The equity share in new issues and aggregate stock returns. *The Journal of Finance*, 55(5), pp.2219-2257.
- [3] Baker, M. and Wurgler, J., 2006. Investor sentiment and the cross-section of stock returns. *The journal of Finance*, 61(4), pp.1645-1680.
- [4] Baker, M. and Wurgler, J., 2007. Investor sentiment in the stock market. *Journal of economic perspectives*, 21(2), pp.129-152.
- [5] Brown, G.W. (1999), Volatility, sentiment, and noise traders. *Financial Analysts Journal*, 55(2), pp.82-90.
- [6] Brown, G.W. and Cliff, M.T., 2004. Investor sentiment and the near-term stock market. *Journal of empirical finance*, 11(1), pp.1-27.
- [7] Clarke, R.G. and Statman, M. (1998), Bullish or bearish? *Financial Analysts Journal*, 54(3), pp.63-72.
- [8] Fisher, K.L. and Statman, M. (2000), Cognitive biases in market forecasts. *The Journal of Portfolio Management*, 27(1), pp.72-81.
- [9] Gao, L. and Kling, G. (2008), Corporate governance and tunneling: Empirical evidence from China. *Pacific-Basin Finance Journal*, 16(5), pp.591-605.

- [10] Graham, B. (1973), *The Intelligent Investor*, Harper and Row, New York, NY.
- [11] Grossmann, A., Ozuna, T. and Simpson, M.W., 2007. ADR mispricing: Do costly arbitrage and consumer sentiment explain the price deviation? *Journal of International Financial Markets, Institutions and Money*, 17(4), pp.361-371.
- [12] Lee, C., Shleifer, A. and Thaler, R.H. (1991), Investor sentiment and the closed-end fund puzzle. *The Journal of Finance*, 46(1), pp.75-109.
- [13] Lynch, P. and Rothchild, J. (2000), *One up on Wall Street: how to use what you already know to make money in the market*. Simon and Schuster, New York, NY.
- [14] Otoo, M.W. (1999), Consumer sentiment and the stock market.
- [15] Ritter, J.R. (1991), The long-run performance of initial public offerings. *The journal of finance*, 46(1), pp.3-27.
- [16] Simon, D.P. and Wiggins III, R.A. (1999), *Stock returns and sentiment indicators*. Working Paper, Bentley College.
- [17] Stigler, George J. (1964), Public regulation of the securities markets, *Journal of Business* 37, 117–142.
- [18] Swaminathan, B. (1996), Time-varying expected small firm returns and closed-end fund discounts. *Review of Financial Studies*, 9(3), pp.845-887.
- [19] Verma, R. and Soydemir, G., 2006. The impact of US individual and institutional investor sentiment on foreign stock markets. *The Journal of Behavioral Finance*, 7(3), pp.128-144.
- [20] Zweig, M.E. (1973), An investor expectations stock price predictive model using closed-end fund premiums. *The Journal of Finance*, 28(1), pp.67-78.

APPENDIX I

Table X. Panel regression with fixed effects

Variable	Coefficient	t-Stat.
C	0.134***	4.236
BETA	-0.015***	-26.518
DEBT	0.037***	7.418
TIE	0.000	1.287
ROA	0.216***	11.846
MRET	1.075***	141.240
SIZE	-0.024***	-16.913
TAG	0.014**	2.145
EPSG	0.002***	7.417
TATURN	-0.036***	-5.463
CUR	0.000	-0.272
STURN	0.002***	84.057
YIELD	-0.001***	-12.572
CPI	-0.001	-1.166
IO	0.000***	7.581
FX	0.202***	8.608
RF	0.007***	9.563
Adj. R ²	0.326	
Obs.	79412	

***, **, * - significance at 1%, 5%, 10% respectively