BI Norwegian Business School – Master Thesis

- The effect of investor sentiment on stock returns in Norway and Vietnam -

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Campus:
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Date of submission:
31.08.2013

Study Programme:
Master of Science in Business and Economics: Major in Finance

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Abstract

This study investigates the effects of investor sentiment on stock returns in the Norwegian and Vietnamese stock markets. The model introduced by Baker and Wurgler (2006) has been utilized in which a composite sentiment index has been constructed based on six proxies. Two additional proxies for investor sentiment, *VIX* and *CCI*, have been added in order to improve the estimating power of the sentiment index. Through establishing portfolios of different types of stocks, we found that the sentiment effect on returns is stronger for stocks that are hard to value and hard to arbitrage, i.e. small, high volatility, non-dividend-paying, and value stocks. Sentiment negatively predicts these types of stocks' returns, i.e. when sentiment is low (high), future stock returns tend to be higher (lower). Particularly in Norway, when sentiment is high, subsequent returns are relatively low for small firms and unprofitable firms. In Vietnam, when sentiment is high, subsequent returns are relatively low for small firms and firms with highly volatile stock returns. And vice-versa.

The results from a robustness test of the orthogonalized sentiment indices for Norway and Vietnam shows that the sentiment indices for Norway are sensitive to *VIX* whereas the sentiment indices in Vietnam show no pattern. This implies that *VIX* plays an important role when constructing the sentiment index in a developed stock market, i.e. Norway, than in an emerging stock market, i.e. Vietnam. *CCI* as a sentiment proxy can also forecast stock returns in Norway, however, its predictive power is not as strong as *VIX*.

1. Introduction

Whether investor sentiment affects stock returns has been an important topic in recent academic literature. Investor sentiment is the propensity of individuals to trade based upon emotions and 'noise' instead of facts. Due to sentiment, investors form expectations about future cash flows and investment risks that are not justified (Swedroe 2012). Conventional theories are the classic argument against sentiment effects because they presume that investors are rational. The idea is mainly that rational traders seeking to exploit profit opportunities caused by mispricing will eliminate sentiment effects. However, sentiment effects become more likely if rational traders are not able to fully exploit these opportunities (Stambaugh, Yu and Yuan 2010). Behavioral finance theories therefore contest the rationality hypothesis by assuming that investors are irrational, and that they are prone to exogenous sentiment waves. Investors may have incorrect stochastic expectations, either with overly pessimism or optimism, which results in an incorrect valuation of asset values, causing asset prices to deviate from their intrinsic values. As economic fundamentals are revealed and sentiment diminishes, the mispricing is corrected. A negative relation between investor sentiment and future stock returns is a consequence of this mispricing correction, i.e. when sentiment is high (low), future stock returns tend to be lower (higher). This indicates that investor sentiment can have a predictive power on stock returns (Dergiades 2012; Chung, Hung and Yeh 2012).

Previous empirical studies have found that investor sentiment can predict stock returns. Although the different studies have utilized various proxies for investor sentiment, their common finding is that high sentiment has a negative effect on stock returns and vice versa, i.e. investor sentiment can forecast stock returns negatively in the time series (Brown and Cliff 2005). Schmeling (2009) employed a cross-sectional perspective and provided evidence from 18 industrialized countries which showed that investor's sentiment acts on average as a significant predictor for stock returns. Fisher and Statman (2000) and Baker and Wurgler (2006) have shown that there exist profitable strategies that take advantage of stock return movements induced by sentiment fluctuations. The latter study found that stock characteristics such as firm volatility, age and size, can affect sentiment's predictive effect on return. Lemmon and Portniaguina

(2006) also provided evidence of investor sentiment predicting the returns on small size stocks.

Most studies on investor sentiment have mainly focused on the U.S. market. Looking at a Scandinavian market, the Oslo Stock Exchange (OSE) has a long operating history as the main trading market of Norwegian shares. Norway is considered an *industrialized country* in which its stock market is regarded as long-lasting, and stable with sophisticated investors. It is therefore worth investigating if the Norwegian stock market is affected by investor sentiment. Additionally, whether the sentiment index in Norway retains the expected appealing properties and conforms to Baker and Wurgler's (2006) findings is also studied.

Vietnam, however, is characterized as an *emerging economy.* Rapidly growing markets are expected to have a larger number of unsophisticated investors, and thereby more irrational, than developed markets. As a consequence, the market mispricing should be more affected by this sentiment, and the role of investor sentiment should be tremendous in these countries (Kling and Gao 2008). In particular, the Vietnamese market has been characterized as an emerging economy and a transitional economy because of its lack of earnings history, unlimited growth potential, and unsophisticated investors. High volatility characterizes the young stock market in Vietnam, which was officially established on July 20, 2000 with a base index value of 100 (VNINDEX). In 2007, it experienced a spectacular bubble when VNINDEX rocketed up to 1167.36 points. Consequently, this bubble was followed by a stock market crash when it dropped from 921 to 316 points during 2008 and down to 235.5 in 2009. The total market capitalization value slumped from 27.5% of GDP in 2007 to 10.5% in 2008, and recently 14.8% in 2011. As a result, Vietnam was ranked as the third-worst-performing market worldwide with a loss of 27% in 2011(World Bank 2011). This market performance gives rise to the question whether the Vietnamese stock market are profoundly affected by investor sentiment.

The goal of this paper is to investigate the predictive ability of investor sentiment on the cross-section of stock returns in Norway and Vietnam. Following Baker and Wurgler (2006), who claims that there exist no perfect sentiment measure, a composite index is constructed in order to capture the common component of several sentiment proxies. Particularly, the index of sentiment changes is the first principal component of the changes in these six variables: closed-end fund discount, turnover, number of IPOs, average first-day return on

IPOs, the equity share in the new issues, and the dividend premium. In addition, *two proxies* are added to their sentiment index: the Chicago Board Options Exchange Market Volatility Index (*VIX*) and Consumer confidence index (*CCI*). The eight variables are orthogonalized with respect to macroeconomic conditions in order to remove business cycle variation from the sentiment proxies.

This paper differs from previous research by *including two more proxies*, i.e. *VIX* and *CCI*. Baker and Wurgler (2007) mention these potential sentiment proxies, however, Baker and Wurgler's (2006) composite index has not studied the estimating power of *VIX* and *CCI*. Since previous studies have focused on the U.S. stock market, it is important to test the robustness of findings from the U.S. market for other markets that are characterized, e.g. by a different composition of the investor population. This study addresses this issue by presenting out-of sample evidence on investor sentiment impact on the Norwegian and Vietnamese stock market. This paper therefore contributes to the literature by conducting a comparison on *how differently investor sentiment affects stock market returns* in Norway and Vietnam. This type of analysis seems interesting for several reasons. Firstly, adopting an international perspective allows us to form new hypotheses regarding the impact of investor sentiment on returns. This study will explore how different a developed market, such as Norway, is affected by investor sentiment than an emerging market, such as Vietnam. Secondly, utilizing Norwegian and Vietnamese stock return data provides a natural out-of-sample test for previous findings from the U.S. As a result, this paper will examine the predictive ability of investor sentiment on the cross-section of stock returns in Norway and Vietnam.

Furthermore, several sentiment indices are constructed from some composition of sentiment proxies, i.e. the first-stage index with all lead-lag proxies, the parsimonious index, the orthogonalized index, the orthogonalized index without *VIX*, the orthogonalized index without *CCI*, and Baker and Wurgler's index. This procedure examines which one of the sentiment indexes can explain most of the total variance of the first-stage index, which includes all lead and lag sentiment proxies. Especially, whether *VIX* is a reliable proxy when constructing investor sentiment index, which have not received formal research attention, is also investigated.

In order to examine whether sentiment has cross-sectional effects on future stock returns, a sorting approach and a regression approach have been conducted. Using monthly stock returns, the sorting approach forms 10 equally-weighted

portfolios based on seven firm characteristics. Consistent with Baker and Wurgler (2006), patterns in the average returns across deciles reveal that when sentiment is low, future returns are higher for small stocks, high volatility stocks, non-dividend-paying stocks, and value stocks. The regression approach is also conducted in order to test whether the sentiment index can forecast the returns on several long-short portfolios. By using the factors introduced by Fama-French (1993) and an additional momentum factor, this approach controls for the size effect, the growth opportunity effect and the momentum effect. The results from the regression approach partially supports the significance of the patterns found in the sorting approach. In Norway, when sentiment is high, subsequent returns are relatively low for small firms and unprofitable firms. In Vietnam, when sentiment is high, subsequent returns are relatively low for small firms and firms with volatile stock returns. And vice-versa. Generally, the results are consistent with the predictions that sentiment has a more profound effect on stocks that are hard to value and difficult to arbitrage.

The remaining parts of this paper is structured as follows. Section 2 reviews the existing literature and derives testable hypotheses. Section 3 presents the data and the empirical methods used. Section 4 describes the empirical tests. Section 5 concludes.

2. Literature Review

The common findings of the sentiment-return relation opposes the premise of standard finance theory which assumes that stock prices reflect the discounted value of future cash-flows and that arbitrageurs eliminate irrationalities among market participants. Classical finance theories neglect the role of sentiment since investors are presumed to be rational, whereas behavioral finance proposes that waves of irrational sentiment, i.e. excessive optimistic or pessimistic expectations, can persist and impact stock prices (Schmeling 2009). Thus, a mispricing caused by uninformed demand shocks may occur. This is consistent with the assumption that sentiment can be considered as the propensity to speculate and hence reflects investor's optimism or pessimism. Particularly, the sentiment effect on returns should be stronger if arbitrage is risky because of subjective valuations, high volatility, thin trading, and short selling constraints. Specifically, some emerging

economies are characterized by the lack of an earnings history and unsophisticated investors. As a consequence, the impact of investor sentiment should be tremendous in these countries (Kling and Gao 2008).

A number of scholars have provided empirical evidence that show that there exist a negative sentiment-return relation in the U.S stock market, and that proxies for investor sentiment can predict stock returns negatively in the time series (e.g. Brown and Cliff, 2005, Lemmon and Portniaguina, 2006). Delong et al. (1990) predicted that noise trader sentiment can persist in financial markets, and they found that there exist a negative relationship between investor sentiment and future stock returns held by noise traders as the mispricing is eventually corrected. Recently, Baker, Wurgler and Yuan (2010) examined the effect of global and local components of investor sentiment on major stock markets, and whether sentiment spreads across markets. The study concluded that both global and local components of sentiment could predict the returns on high sentiment-beta portfolios, e.g. those containing high volatility stocks or small, distressed, and growth company stocks.

Baker and Wurgler (2006) investigated how investor sentiment impacts the cross-section of stock returns by constructing an investor sentiment index based on the six measures; trading volume as measured by NYSE turnover; dividend premium (the difference between the average market-to-book ratio of dividend payers and non-payers); CEFD; number of IPOs; average first-day returns on IPOs; and equity share in new issues. The authors developed a hard-to-value and difficult-to-arbitrage hypothesis in order to explain the cross-sectional effect of sentiment associated with firm characteristics, particularly for young, small size, unprofitable, growth, distressed, and non-dividend-paying stocks. Because of these stocks' lack of earnings history, tangible assets and collateral, they are more sensitive to subjective valuations and fluctuations in the propensity of speculation. Additionally, these stocks are likely to have lower liquidity and higher idiosyncratic risk, which means that they tend to be the riskiest and costliest to arbitrage. Therefore, these stocks are more profoundly affected by shifts in investor sentiment. The authors found that when beginning-of-period proxies for sentiment are low (high), the following returns are relatively high (low) for small, young, growth and distressed stocks. Building on these findings, Grigaliuniene and Cibulskiene (2010) conducted a study on the sentiment-return relation at an aggregate level and cross-sectionally in the Scandinavian stock

market. Consistent with prior literature, the authors found that high sentiment has a negative impact on future stock returns, in which this effect is stronger for hard-to-value and hard-to-arbitrage stock returns (e.g. growth vs. value, dividend paying vs. non-paying). However, results from different studies are controversial. Baker and Wurgler (2007) reported that sentiment shifts impacts small stock returns rather than large stocks. Glushkov (2006) investigated sentiment betas and showed that value and hard-to-arbitrage stocks are more strongly affected by sentiment. Brown and Cliff (2005) conclude that the sentiment impact is mostly concentrated in large-capitalization growth stocks. On the contrary, Brown and Cliff (2004) found limited evidence of sentiment impacting small stocks. Building on previous literature and findings, particularly Baker and Wurgler (2006), this paper will test whether a wave of investor sentiment has larger effects on securities whose valuations are highly subjective and difficult to arbitrage in Norway and Vietnam:

Hypothesis 1. The sentiment effect on returns is stronger for stocks that are hard to value and hard to arbitrage, e.g. small, growth, and value stocks.

When testing for the impact of sentiment on stock returns, a fundamental question that arises is how to measure the sentiment. Previous papers have utilized various proxies where closed-end fund discounts (*CEFD*) have been a popular proxy, e.g. Lee, Schleifer and Thaler (1991), found that market-wide sentiment affects the differences between close-end fund prices and their net asset values. Ritter (1991) used IPO stocks, and provided evidence of long-run reversals in returns on IPO stocks. His evidence is in line with periodic waves of optimism that particularly affect young growth stock prices. Other scholars used investor surveys data (Brown and Cliff 2005), and micro trading data (Kumar and Lee 2006). Lemmon and Portniaguina (2006) utilized consumer confidence indexes as a proxy for sentiment. Another alternative measure of investor sentiment that has received little attention in previous literature is the Chicago Board Options Exchange's market Volatility Index (*VIX*), which is also called the "investor fear gauge". This index expresses investor's consensus view about expected future stock market volatility. It is constructed from implied volatilities of S&P 500 index options, and is used by traders as a sentiment indicator in which a high *VIX* indicates high fear.

(Whaley 2000). Kurov (2010) used the *VIX* index as an alternative investor sentiment measure, and found that investor sentiment plays a significant role in the effect of monetary policy on the stock market. This paper will use the *VIX* index as a proxy for investor sentiment, in which it is going to be added to Baker and Wurgler's (2006) sentiment index:

Hypothesis 2. VIX as a proxy for investor sentiment can forecast stock returns, in which the sentiment-return relation is significantly negative.

However, overall the results from previous literature about investor sentiment are by no means uniform. Brown and Cliff (2004) who used *CEFD*, found limited proof to support the predictive power of sentiment on stock returns. Qiu and Welch (2005) documented weak correlation between *CEFD* and sentiment, however, the consumer confidence correlated well with investor sentiment. The consumer confidence index has therefore received some attention in the literature as a measure of sentiment. For example, Fisher and Statman (2003) reported that consumer confidence has a positive correlation with other sentiment proxies such as the sentiment measure compiled by the American Association of Individual Investors (AAII). Doms and Morin (2004) reports that the measures of consumer confidence include an irrational element because it responds to the tone and volume of economics news reports rather than economic content. Schmeling (2009) investigated the sentiment-return relation internationally by utilizing consumer confidence as a proxy for investor sentiment in 18 industrialized countries. In most of these 18 industrialized countries, the author found that when consumer confidence is high, future stock returns tend to be lower and vice versa. On average, sentiment negatively forecasted aggregate stock market returns across these countries. The above findings highlights why consumer confidence is a reasonable measure for investor sentiment. This paper will therefore build on previous studies by utilizing consumer confidence as a proxy for investor sentiment, in which it is going to be added to Baker and Wurgler's (2006) sentiment index:

Hypothesis 3. Consumer confidence as a proxy for investor sentiment can forecast stock returns, in which the sentiment-return relation is significantly negative.

The differences between Asian and Western cultures have been an important topic in previous literature. In social psychology, Hofstede (1980) suggested that in a Western culture, when a catastrophic loss occurs, a person is expected to sustain the adverse outcomes of his decisions on his own, while in an Asian culture, his family and friends will intervene to support him. This is an example of the difference on how a Western and Asian culture is affected by a disastrous loss, which indicates that the risk attitude and the propensity to speculation and arbitrage might also differ (Lin 2010). Furthermore, the accumulated studies on sentiment focus mainly on the U.S market or other developed markets, which leads to the question whether this relation holds outside these developed markets. There exist important exceptions, most notably in Asia. Although momentum profits is large and significant in the U.S and most European countries, it has been found that momentum profits is absent in Japan and the rest of Asia (Rouwenhorst, 1998). Therefore, it is important to test the robustness of the findings from the U.S. market for other markets that are characterized, for example, as emerging markets. Rapidly growing markets such as emerging markets are expected to have a larger number of unsophisticated investors, and thereby more irrational, than developed markets. As a consequence, the market mispricing should be more affected by this sentiment, and investor sentiment should have a greater effect on an emerging market than a developed market (Kling and Gao 2008). This paper will test whether the return-sentiment relation holds outside the U.S. by including out-of sample evidence of sentiment effect on the Norwegian and Vietnamese market. These two markets are of special interest because Norway is an industrialized, developed European country, whereas Vietnam is a transitional, emerging Asian economy.

3. Empirical Method and Data

A. Empirical method

Employing Baker and Wurgler's (2006) empirical method, the cross-sectional impact of investor sentiment on stock returns was captured based on the following model:

$$E_{t-1}[R_{it}] = \alpha + \alpha_1 T_{t-1} + \boldsymbol{\beta}_1' \mathbf{x}_{it-1} + \boldsymbol{\beta}_2' T_{t-1} \mathbf{x}_{it-1}$$

where i represents firms, t represents time, x represents a vector of firms' characteristics, and T represents a sentiment proxy. The coefficient α_1 captures the generic effect of investor sentiment, β_1 captures the generic effect of firm characteristics on stock returns whereas β_2 captures sentiment-driven mispricing in cross-sectional patterns. Therefore, the null hypothesis, i.e. $\beta_2 = 0$, suggests that the non-zero effect on stock returns only exists for compensation of systematic risk. On the contrary, if the null hypothesis is rejected, i.e. $\beta_2 \neq 0$, systematic patterns of correction for mispricing might be expected. A cross-sectional approach is taken into consideration due to the fact that the causes of mispricing on stocks vary across sections, namely the stock fundamental characteristics.

B. Returns and characteristics

The data concerning monthly stock returns and characteristics on the firm and security level: size and total risks, profitability, dividend policy, tangibility, growth opportunities and distress, are from the DataStream database. The sample consists of all common stocks in the Oslo Bors All-Share Index (OSLO SE OBX) and Ho Chi Minh Stock Exchange (HOSE) from January 01, 1991, for the former, and from July 28, 2000, for the latter, up to July 01, 2013. Regardless of the lack of information in Vietnam's subsample before 2005, this database is still utilized in order to ensure data consistency across countries and to avoid several biases from analyses, e.g. survivorship bias. For simple calculation, the firm-level data in the previous year (*t-1*) is matched to the monthly returns in the current calendar year (*t*).

Table I provides descriptive statistics for all returns and characteristic variables following Baker and Wurgler's (2006) definitions. Panel A shows the returns variables. Returns (*R*) are computed from monthly changes in the Total return index (RI) which includes dividend yield. Momentum (*MOM*) is calculated as the accumulation of 11 monthly returns from 12 to 2 months prior to the given month.

The firm and security characteristics data are summarized in the different panels. Panel B reports the size and total risk characteristics. Size is calculated as the log of market equity (*ME*). Market equity (W08001) is defined as the multiple of the stock price and its number of common shares outstanding. Total risk (σ) is computed as the annualized standard deviation in monthly returns for the 12 month period, from January to December each year. Total standard deviation over the first 6 months of 2013 for all stocks on OBX and HOSE are also annually estimated.

Panel C presents the profitability variables. The ratio of earnings to book equity, i.e. return on equity (*E/BE*) is defined for firms with positive earnings. Earnings (*E*) are measured as the net income before extraordinary items/preferred dividends (WC01551), plus deferred income taxes and investment tax credit on income statements (WC04101), and minus preferred dividend requirements (WC01701). Book equity (*BE*) is computed as total shareholders' equity (WC03995) plus deferred taxes (WC03263) on balance sheets. The dummy variable for profitability (*E>0*) is set value to one for profitable firms and zero for unprofitable firms.

Panel D shows dividend characteristics, which are consist of the ratio of dividends to equity (*D/BE*). Dividends (*D*) are defined as the multiplicity of dividends per share (DPS) and the number of shares outstanding (W05301). The dummy variable for dividend policy (*D>0*) is set to the value of one for firms which pay positive dividends and zero for firms which pay no dividends.

Panel E summarizes characteristics of asset tangibility, i.e. *PPE/A* and *RD/A*. The former (*PPE/A*) is the proportion of gross plant, property, and equipment (WC02301) whereas the latter is the proportion of research and development expense (WC01201) in total assets (WC02999). However, the data concerning R&D are relatively insufficient among concerned variables.

Characteristics of growth opportunities and distress or both are represented in Panel F. The book-to-market ratio (*BE/ME*) is calculated as the book equity

over market equity for the 12 month period prior to the current observation. The characteristic of external finance (*EF/A*) is measured as the ratio of external finance (WC04500), which consist of company financing from outside sources, to the total assets in the previous year. Following Baker and Wurgler (2004) sales growth is measured as the percentage change of net sales or revenues (WC01001) over the year.

The subsample means of the returns and characteristics variables are also calculated in order to give an overview of trends over time.

Table IA

Summary Statistics, Norway, 1991-2013

This table presents the descriptive statistics for all returns and characteristics variables. Panel A shows the returns variables. Returns (R) are monthly returns computed as monthly changes in the Total return index (RI) which includes dividend yield. Momentum (MOM) is calculated as the cumulative return for the 11-month period between 12 and 2 months prior to t. Panel B reports the size and total risk characteristics. Size is calculated as the log of market equity (ME). Market equity (ME) is defined as stock price times common shares outstanding. Total risk (σ) is computed as the annualized standard deviation in monthly returns for the 12 month period, from January to December each year. The return on equity (E/BE) is defined for firms with positive earnings. Earnings (E) are calculated as income before extraordinary items plus income statement deferred taxes minus preferred dividends. Book equity (BE) is calculated as shareholder's equity plus balance sheet deferred taxes. The profitability dummy variable (E>0) equals one for profitable firms and zero for unprofitable firms. Panel D summarizes dividend variables, which includes dividends-to-equity (D/BE). Dividends (D) are defined as dividends per share times shares outstanding. The dividend dummy variable (D>0) is equal to one for firms with positive dividends and zero for non-paying dividend firms. Panel E summarizes measures of tangibility. Plant, property, and equipment (PPE) and research and development (RD) are scaled by total assets (A). Panel F summarizes growth opportunities and distress variables. The book-to-market ratio (BE/ME) is calculated as the book equity over market equity for the 12 months prior to t. External finance (EF) represents company financing from outside sources. It includes the issuance and retirement of stock and debt. Sales growth (GS) is computed as the percentage change in net sales over the year. In Panels C through F, accounting data from the fiscal year ending in t − 1 are matched to monthly returns in calendar year t.

	Full Sample						**Subsample Means**		
	N	Mean	Median	SD	Min	Max	1990s	2000s	2010-2013
Panel A: Returns									
R_t(%)	50111	0.99	0	18.72	-98.72	1400	1.41	0.82	0.68
MOM_{t-1}(%)	42413	10.33	9.37	62.44	-396.92	1270	19.79	12.24	-5.31
Panel b: Size and Total Risk									
ME_{t-1}(1000NOK)	46328	4356.65	625.53	23394.13	0.83	539000.00	1875.15	4810.68	6808.37
σ_{t-1} (%)	47598	46.97	37.72	43.08	0	1422.97	43.61	47.35	50.88
Panel C: Profitability									
$E+/BE_{t-1}$ (%)	48030	-3.18	7.05	465.16	-19102.59	9767.00	5.89	0.14	-33.37
$E > 0_{t-1}$	53970	0.66	1	0.47	0	1	0.73	0.64	0.58
Panel D: Dividend Policy									
D/BE_{t-1} (%)	42495	4.09	0.28	17.29	-136.12	531.35	2.99	4.72	4.13
$D > 0_{t-1}$	44585	0.51	1	0.50	0	1	0.59	0.47	0.43
Panel E: Tangibility									
PPE/A_{t-1} (%)	36120	121.25	67.82	1937.18	0	105182.50	103.15	136.66	98.79
RD/A_{t-1} (%)	9968	8.40	1.49	23.57	0	504.42	7.86	9.79	5.93
Panel F: Growth Opportunities and Distress									
BE/ME_{t-1}	41623	1.42	0.84	3.08	-79.58	71.26	1.65	1.27	1.47
EF/A_{t-1} (%)	46813	454.11	2.47	24648.92	-1887.49	1534837.00	25.36	827.01	12.52
GS_{t-1} (%)	51521	11.73	0	791.88	-161.04	118421.60	2.66	13.64	21.09

Table IB

Summary Statistics, Vietnam, 2005-2013

This table presents the descriptive statistics for all returns and characteristics variables. Panel A shows the returns variables. Returns (R) are monthly returns computed as monthly changes in the Total return index (RI) which includes dividend yield. Momentum (MOM) is calculated as the cumulative return for the 11-month period between 12 and 2 months prior to t. Panel B reports the size and total risk characteristics. Size is calculated as the log of market equity (ME). Market equity (ME) is defined as stock price times common shares outstanding. Total risk (σ) is computed as the annualized standard deviation in monthly returns for the 12 month period, from January to December each year. The return on equity (E/BE) is defined for firms with positive earnings. Earnings (E) are calculated as income before extraordinary items plus income statement deferred taxes minus preferred dividends. Book equity (BE) is calculated as shareholder's equity plus balance sheet deferred taxes. The profitability dummy variable (E>0) equals one for profitable firms and zero for unprofitable firms. Panel D summarizes dividend variables, which includes dividends-to-equity (D/BE). Dividends (D) are defined as dividends per share times shares outstanding. The dividend dummy variable (D>0) is equal to one for firms with positive dividends and zero for non-paying dividend firms. Panel E summarizes measures of tangibility. Plant, property, and equipment (PPE) and research and development (RD) are scaled by total assets (A). Panel F summarizes growth opportunities and distress variables. The book-to-market ratio (BE/ME) is calculated as the book equity over market equity for the 12 months prior to t. External finance (EF) represents company financing from outside sources. It includes the issuance and retirement of stock and debt. Sales growth (GS) is computed as the percentage change in net sales over the year. In Panels C through F, accounting data from the fiscal year ending in t − 1 are matched to monthly returns in calendar year t.

	Full Sample						**Subsample Means**	
	N	Mean	Median	SD	Min	Max	2005-2009	2010-2013
Panel A: Returns								
R_t(%)	15744	-0.19	-1.76	16.37	-67.82	389.28	0.72	-0.51
MOM_{t-1}(%)	8680	-9.37	-16.16	62.85	-278.83	289.64	-47.19	-6.25
Panel b: Size and Total Risk								
ME_{t-1}(1000NOK)	14900	1870	359	6080	11.02	7340	1330	2090
σ_{t-1} (%)	12215	49.14	43.03	27.08	2.96	387.94	64.92	45.71
Panel C: Profitability								
$E+/BE_{t-1}$ (%)	19099	26.51	16.82	96.74	-231.05	3281.05	33.22	19.88
$E > 0_{t-1}$	21767	0.96	1.00	0.21	0	1.00	0.97	0.95
Panel D: Dividend Policy								
D/BE_{t-1} (%)	12873	6.19	5.75	11.57	-786.70	68.49	4.81	6.84
$D > 0_{t-1}$	11904	0.73	1.00	0.44	0.00	1.00	0.53	0.78
Panel E: Tangibility								
PPE/A_{t-1} (%)	18533	52.22	42.36	43.10	0.18	358.92	56.99	47.52
RD/A_{t-1} (%)	84	1.39	0.45	1.56	0	4.35	1.35	1.45
Panel F: Growth Opportunities and Distress								
BE/ME_{t-1}	12366	1.17	0.95	0.88	-1.47	6.66	0.91	1.30
EF/A_{t-1} (%)	19075	27.64	-0.44	644.65	-42.93	25661.58	21.21	33.98
GS_{t-1} (%)	21418	4.11	0.00	162.06	-100.00	22865.75	3.75	4.38

C. Potential sentiment proxies

In previous literature, investor sentiment can be investigated by two approaches; explicit sentiment proxies based on investor surveys, and implicit sentiment proxies based on market variables. The latter approach has attracted much attention, in which the overall sentiment is derived from market statistics, e.g. price movements, trading patterns, etc. However, the forecasting power of each individual sentiment proxy as a sentiment index is quite poor due to its own idiosyncratic component. Following a similar methodology introduced by Baker and Wurgler (2006), a composite sentiment index is constructed on the common variation basis of 6 proxies including the closed-end mutual fund discount (*CEFD*), share turnover (*TURN*), the number of IPOs (*NIPO*), the average first-day return on IPOs (*RIPO*), the share of equity issues (*ES),* and the dividend premium ($P^{D\text{-}ND}$).

Firstly, the closed-end mutual fund discount (*CEFD*), is defined as the year-end, value-weighted average discount on closed-end mutual funds. It is measured as the ratio of the difference between a fund's net asset value (NAV) and its market price to its NAV. *CEFD* takes positive values if funds are trading at a discount and vice versa. Previous studies, e.g. Zweig (1973) and Delong et al. (1990), argue that the average *CEFD* might be a sentiment index which captures investor expectations, i.e. the more bearish the retail investors are, the higher the discount is, as a compensation for the buyers (Baker and Wurgler 2007). *CEFD* is expected to have a negative relationship with the sentiment factor. There exist 4 closed-end funds in the Norwegian sample and 5 funds in the Vietnamese sample.

Secondly, share turnover (*TURN*) is the ratio of total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period. Turnover, or liquidity generally, might capture sentiment due to the fact that irrational investors prefer betting on raising stocks in a market with short-sales constraints when they are optimistic than pessimistic and therefore add liquidity (Baker and Stein 2004). Consistent with prior literature, the relationship between turnover and market returns is expected to be negative (Jones 2001). *TURN* is defined as the natural log of turnover which is obtained from Thomson Reuters DataStream.

Thirdly, the number and the average first-day return on IPOs (*NIPO*, *RIPO*) are obtained and calculated from Oslo Bors Information (OBI) and HOSE. *NIPO* and *RIPO* are annually measured. Baker and Wurgler (2006) suggest that *NIPO*, i.e. IPO volume, which represents the underlying demand for IPOs increases when the sentiment is high. However, it has a characteristic of high fluctuation and large sensitivity to investor sentiment. *RIPO* is calculated as the difference between the first trading price and the offer price divided by the offer price. *RIPO*, which is computed as an equal-weighted return in the observed month, is expected to be positively related to investor sentiment. However, data on *RIPO* is not accessible in Vietnam due to lack of information.

Fourthly, the share of equity issues (*ES*) in total equity and debt issues by all firms, or more generally equity financing activity, may measure investor sentiment. Baker and Wurgler (2000) find that equity might be overvalued due to investor sentiment. Therefore, there is more equity issuance than debt issuance in order to reduce the cost of capital when sentiment is high, i.e. high values of the equity share forecast low stock market returns. *ES* is measured as the proportion of aggregate equity issuance in aggregate equity and debt issuance published annually by Oslo Bors and HOSE.

Finally, the dividend premium ($P^{D\text{-}ND}$) is defined as the log difference between the average market-to-book ratios of the payers and nonpayers. The dividend premium represents a firm's propensity to pay dividends and can serve as a proxy for a characteristic of safety, i.e. those firms which are larger, more profitable, but with lower growth opportunities (Baker and Wurgler 2007). An inverse relationship is expected between $P^{D\text{-}ND}$ and sentiment investor. $P^{D\text{-}ND}$ is calculated at the end of the year after sorting all securities on OBX and HOSE into payers and nonpayers using raw data from DataStream.

Additionally, in recent literature, multiple potential sentiment proxies may be considered in order to increase the forecasting power of these common proxies as well as tackle data insufficiency. Baker and Wurgler (2007) suggest both explicit and implicit sentiment proxies including investor surveys, investor mood, retail investor trades, mutual fund flows, option implied volatility, and insider trading. Among these proxies, Option Implied Volatility and Consumer Confidence Index are employed to establish a composite sentiment index.

Firstly, Option Implied Volatility (*VIX*) might reflect investor sentiments generally due to the fact that the greater the forecasted volatility might be, the

higher the expected option price should be (Baker and Wurgler 2007). This implied volatility might be characterized by *VIX*, which is a measure of Standard and Poor's 100 index option volatility on the Chicago board of exchange. *VIX* is considered as "investor fear gauge" because it is likely to increase sharply when markets decline steeply during financial stress. *VIX* is simply obtained from Yahoo Finance.

Secondly, Consumer Confidence Index (*CCI*) is employed as the only explicit sentiment proxy as proposed by Lemmon and Portniaguina (2006), Qui and Welch (2006). This metric is defined as the degree of consumers' optimism on the economic state that was presented in their saving and spending activities. There are several reasons why *CCI* should be included to capture investor sentiment. Firstly, there exist data for consumer confidence internationally, in both developed and developing countries. Secondly, this metric can be collected easily for reasonable periods of time as time-series data. Thirdly, although *CCI* is measured slightly different across countries, it seems to be the most consistent comparability of sentiment data. *CCI* is not obtained directly from trading data but from the behavior of respondents through surveys on their expectations about their financial situation as well as the whole economy. Hence, *CCI* contains an irrational element which is needed in order to investigate investor sentiment (Doms and Morin 2004). Moreover, previous literature report no or weak correlation of closed-end fund discounts with investor sentiment (Brown and Cliff (2004), Qiu and Welch (2005). However, other studies showed evidence of the correlation between *CCI* and the other sentiment proxies (Fisher and Statman 2003). Consistent with previous findings, *CCI* is expected to be inversely related with stock returns (Schmeling 2009). Data on *CCI* are obtained from DataStream (NWCNFCONQ) for the period of 10 years (Q3 1992 - Q4 2012) in Norway and from the database of The Nielsen Company, available from Q1 2006 to Q4 2012.

D. A composite sentiment index

Prior research show that each of the above-mentioned proxies might serve as a sentiment index. However, beside the sentiment component each proxy may capture, there also exist other components, which are unrelated to the sentiment factor, i.e. idiosyncratic components. Therefore, following a similar methodology proposed by Baker and Wurgler (2006), a composite sentiment index is formed based on the common variation in the chosen proxies. Principal Components Analysis (PCA) is utilized in order to isolate the sentiment component which is common among those proxies.

Table II presents the summary statistics of sentiment proxies which are employed to extract the sentiment component for each country. As for Norway, 8 proxies are analyzed including *CEFD, TURN, NIPO, RIPO, ES,* $P^{D\text{-}ND}$*, VIX*, and *CCI*. As for Vietnam, a sentiment index is constructed from 6 proxies including *CEFD, TURN, NIPO, ES, VIX* and *CCI*. The data on dividend premium in Vietnam is available; however, it is excluded due to the fact that it has no correlation with other proxies.

Baker and Wurgler (2006) find that the determination of relative timing of those proxies is of concern due to a non-contemporaneous relationship between these proxies and investor sentiment. Some proxies may not reflect the fluctuation of sentiment simultaneously but reveal the sentiment earlier or later than the others, i.e. a lead-lag relationship. In prior research, *ES* and *NIPO*, which are related to firm supply responses are supposed to lag behind *CEFD, TURN, RIPO,* $P^{D\text{-}ND}$, which are related to investor behavior (Ibbotson and Jaffe 1975, Lowry and Schwert 2002). There is no clear evidence that *CCI* and *VIX* have a lead or lag relationship with other proxies in prior research. However, *VIX* and *CCI* are expected to reflect the sentiment simultaneously because they are based on investor behavior. Baker and Wurgler (2006) find that *TURN, RIPO*, and $P^{D\text{-}ND}$ take longer to fully reveal the sentiment compared to *CEFD*, *NIPO*, and *ES*.

Through conducting a PCA, the first principal component of 8 proxies in Norway, i.e. *CEFD, TURN, NIPO, RIPO, ES,* $P^{D\text{-}ND}$*, VIX, CCI*, and their one-year lags, i.e. $CEFD_{t-1}$, $TURN_{t-1}$, $NIPO_{t-1}$, $RIPO_{t-1}$, ES_{t-1}, $P^{D\text{-}ND}_{t-1}$, VIX_{t-1}, CCI_{t-1} are estimated for Norway. This process results in the first-stage index with 16 loadings, i.e. component coefficients, for each proxy and its lag. The correlation between the first-stage index and 8 pairs of a proxy's lead or lag are then

calculated. Consequently, 8 current or lagged proxies which have higher correlation within each pair are selected. The PCA is repeated to extract the first principal component of these 8 chosen proxies. After the coefficients are rescaled, the parsimonious index has unit variance and is estimated as the following equation:

$$SENTIMENT_t = -0.113CEFD_t + 0.194TURN_{t-1} + 0.198NIPO_t - 0.150RIPO_{t-1} - 0.036ES_t + 0.190P_{t-1}^{D-ND} - 0.158IX_{t-1} + 0.167CCI_t \quad (1)$$

As a result, 65.94% of the sample variance can be explained by the first principal component, suggesting that most of the common variation are captured by this factor. The pair-wise correlation between the SENTIMENT index (1) and the first-stage index with 16 loadings is estimated at 0.92, indicating that the estimating power of the 8 loadings that were left unchosen is not substantial, i.e. little information is lost (Baker and Wurgler 2006).

Following a similar approach, the first-stage index with 12 loadings for Vietnam is estimated as the first principle component of 6 proxies including *CEFD, TURN, NIPO, ES, VIX, CCI* and their lags $CEFD_{t-1}$, $TURN_{t-1}$, $NIPO_{t-1}$, ES_{t-1}, VIX_{t-1}, CCI_{t-1}. After the selection between the lead or lag of the 6 proxies based on its highest correlation with the first-stage index, the PCA procedure is applied again and extract the parsimonious index for Vietnam, which explains 72.29% of the sample variance and has the pair-wise correlation with the first-stage index estimated at 0.93.

$$SENTIMENT_t = -0.052CEFD_{t-1} - 0.244TURN_{t-1} + 0.293NIPO_{t-1} - 0.382ES_{t-1} + 0.390VIX_t - 0.081CCI_t \quad (2)$$

In the *SENTIMENT* index (1) for Norway, most of the estimated signs meet expectations, i.e. *CEFD, TURN, NIPO, VIX,* and *CCI*, whereas only *RIPO,* $P^{D\text{-}ND}$ and *ES* are not consistent. Only *CEFD* and CCI follow the order of lead-lag relationship as expected above. However, the SENTIMENT index (1) supports the result founded by Baker and Wurgler (2007), i.e. *TURN, RIPO*, and $P^{D\text{-}ND}$ lag behind *CEFD*, *NIPO*, and *ES*. However, the *SENTIMENT* index (2) for Vietnam displays quite few expected properties due to the fact that few estimated signs are as predicted, i.e. *CEFD*, *NIPO*. Nevertheless, $NIPO_{t-1}$, ES_{t-1}, VIX_t and CCI_t follow predictions for their lead-lag relationship.

These 2 parsimonious indices seem not to be totally consistent with the predictions due to the fact that the PCA treats and extracts a common component based on common variation in the same way regardless of sentiment component or just business cycle component. Moreover, because investors are overly optimistic or pessimistic based on a series of news, returns, or macro developments (Qiu and Welch 2005), a sentiment index should be removed the effects of business cycle. Based on the earlier empirical research, an identical composition of 4 additional macroeconomic variables motivated by asset pricing theory is employed. Firstly, Consumer Price Index, i.e. CPI, is to measure the development of the cost of living (Brown and Cliff 2005, Lemmon and Portniaguina 2006, Schmeling 2009). Secondly, Industrial production index, i.e. IPI, is the indicator measuring the output amount of manufacturing, mining, electric and gas industries. Thirdly, Gross domestic product, i.e. GDP, is an indicator for total value added in a country as well as gross income from domestic production (Chen, Roll and Ross 1986, Lemmon and Portniaguina 2006). Finally, the policy interest rate is employed to reflect the foundations of monetary policy in each country. All these 4 indicators are obtained from DataStream for Norway and Vietnam on a yearly basis. Therefore, each of 8 proxies which exist in the SENTIMENT index (1) and 6 proxies in the SENTIMENT index (2) are regressed as a function of 4 macroeconomic variables respectively. The residuals of these regressions, labeled with a superscript $\perp$, may serve as cleaner proxies, i.e. orthogonalized proxies, for investor sentiment.

Using the same PCA procedure, a second sentiment index for Norway is extracted as the first principal component of 8 orthogonalized proxies, which explains 48.43% of the sample variance

$$SENTIMENT_t^{\perp} = 0.006CEFD_t^{\perp} + 0.292TURN_{t-1}^{\perp} + 0.290NIPO_t^{\perp} + 0.127RIPO_{t-1}^{\perp} + 0.096ES_t^{\perp} + 0.300P_{t-1}^{D-ND\perp} - 0.109VIX_{t-1}^{\perp} + 0.199CCI_t^{\perp} \quad (3)$$

The first eigenvalue is estimated at 3.87, compared to 2.02 of the second eigenvalue. There are three changes of estimated signs in 3 components, i.e. *CEFD, RIPO, ES.* Although the pair-wise correlation with the first-stage index at 0.82, lower than before controlling for other macroeconomic effects, the orthogonalized index still maintains appealing properties from the SENTIMENT index (1) considering the signs and lead-lag relationship among the proxies.

Consequently, the signs of *TURN, NIPO, RIPO, ES, VIX* and *CCI* are now as predicted.

A orthogonalized index for Vietnam is also constructed as

$$SENTIMENT_t^{\perp} = -0.011CEFD_{t-1}^{\perp} + 0.347TURN_{t-1}^{\perp} + 0.363NIPO_{t-1}^{\perp} - 0.023ES_{t-1}^{\perp} + 0.397VIX_t^{\perp} - 0.006CCI_t^{\perp} \quad (4)$$

As a result, the sign of *TURN* changes and the second index conform to expectations. The resulting index is the second principal component extracted through the PCA of 6 orthogonalized proxies. This component, which has eigenvalue of 2.378 and explains 39.63% of the total variance, has a pair-wise correlation of 0.74 with the first-stage index. The first principal component is excluded due to the fact that it fails to capture the common variance of these 6 orthogonalized proxies. The above-mentioned pair-wise correlation is estimated at -0.69, although the eigenvalue is estimated at 3.071 and 51.19% the total variance is explained (Appendix 1 and 2).

Table II provides the descriptive statistics for all raw sentiment proxies as well as for orthogonalized proxies after controlling for macroeconomic conditions for both countries. The correlations within sentiment components as well as the correlations with the parsimonious indices (1) and (2), and the orthogonalized indices (3) and (4) are also given. The correlations among the orthogonalized proxies tend to be slightly higher than raw proxies.

Figure 1 compares all the raw proxies and the residuals from the regressions on the composite of macroeconomic variables. Panel E plots the first principal component index of the 8 raw and orthogonalized proxies for Norway and the second principal component index of 6 proxies for Vietnam, respectively. Several proxies, i.e. *CEFD, ES* in Norway and *TURN, ES* in Vietnam, are influenced by economic conditions as illustrated. Therefore, the orthogonalized proxies are employed in further analyses.

Table IIA

Investor Sentiment Data, Norway, 1991-2013

This table presents the means, standard deviations, and correlations for measures of investor sentiment. Panel A reports the raw sentiment proxies. Closed-end mutual funds (CEFD) are defined as the year-end, value-weighted average discount on closed-end mutual funds. It is calculated as net asset values (NAV) minus market price divided by NAV times 100. The data on market prices and NAVs are obtained from Datastream and Oslo Bors. TURN is defined as the natural log of turnover. Turnover is the ratio of total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period. NIPO is the annual number of initial public offerings obtained from OBI. RIPO is measured annually and is defined as the average first-day returns of initial public offerings. RIPO is calculated as the difference between the first trading price and the offer price divided by the offer price. ES is measured as the proportion of aggregate equity issuance in aggregate equity and debt issuance published annually by Oslo Bors. PD-ND is calculated at the year-end log ratio of the equal-weighted average market-to-book ratios after sorting all securities on OBX into payers and nonpayers using raw data from Datastream (Baker and Wurgler 2004). TURN, RIPO, PD-ND and VIX are lagged 1 year relative to the other four measures. VIX is the natural log of the Chicago Board Options Exchange Market Volatility Index, which is measures the implied volatility of S&P500. CCI is the natural log of the yearly Consumer confidence index, which is based on survey data on consumer's confidence. SENTIMENT is the first principal component of the eight sentiment proxies. In panel B, each of the eight proxies is regressed on CPI, IPI, GDP, and Central Bank's key policy rate. The orthogonalized proxies, labeled with a "⊥," are the residuals from these regressions. SENTIMENT⊥ is the first principal component of the eight orthogonalized proxies.

						Correlations with Sentiment		Correlations with Sentiment Components							
	Mean	Median	SD	Min	Max	SENTIMENT	SENTIMENT⊥	CEFD	TURN	NIPO	RIPO	ES	P^{D-ND}	VIX	CCI
Panel A: Raw Data															
$CEFD_t$	-0.24	-0.02	0.61	-1.22	0.69	-0.22	-0.31	1							
$TURN_{t-1}$	4.39	4.41	0.45	3.32	5.03	0.97	0.91	-0.18	1						
NIPOt	22.64	20.50	15.40	3.00	59.00	1.00	0.93	-0.22	0.96	1					
$RIPO_{t-1}$	-0.50	-0.06	1.16	-3.17	1.06	-0.64	-0.44	0.21	-0.74	-0.59	1				
ES_t	0.05	0.03	0.04	0.01	0.13	-0.40	-0.26	-0.63	-0.52	-0.38	0.54	1			
$P^{D-ND}{}_{t-1}$	-0.14	-0.19	0.32	-0.45	1.14	0.92	0.82	-0.20	0.89	0.92	-0.60	-0.45	1		
VIX_{t-1}	2.93	2.96	0.34	2.45	3.69	-0.86	-0.63	-0.16	-0.87	-0.84	0.75	0.70	-0.80	1	
CCI	2.88	3.07	0.58	1.62	3.52	0.84	0.63	-0.02	0.77	0.83	-0.51	-0.35	0.78	-0.88	1
Panel B: Controlling for Macroeconomic Conditions															
$CEFD⊥_t$	3.1E-15	-0.02	0.35	-0.84	0.69	-0.19	-0.06	1							
$TURN⊥_{t-1}$	2.2E-16	0.00	0.27	-0.64	0.44	0.95	0.83	0	1.00						
NIPO⊥t	2.8E-14	-1.46	11.50	-17.47	25.01	0.91	1.00	-0.08	0.82	1					
$RIPO⊥_{t-1}$	2.8E-15	0.32	1.01	-2.21	1.07	-0.28	-0.23	0.46	-0.24	-0.26	1				
$ES⊥_t$	-3E-16	0.00	0.02	-0.05	0.03	-0.06	0.00	-0.66	0.06	0.00	0.27	1			
$P^{D-ND}{}_{⊥t-1}$	-2E-16	-0.06	0.30	-0.30	1.23	0.89	0.70	-0.19	0.84	0.69	-0.09	-0.02	1		
$VIX⊥_{t-1}$	-1E-16	-0.04	0.25	-0.42	0.58	-0.71	-0.64	-0.20	-0.65	-0.65	0.53	0.67	-0.53	1	
CCI⊥	-5E-16	0.15	0.46	-1.22	0.60	0.62	0.77	0.25	0.53	0.77	-0.29	-0.29	0.45	-0.68	1

Table IIB

Investor Sentiment Data, Vietnam, 2000-2013

This table presents the means, standard deviations, and correlations for measures of investor sentiment. Panel A reports the raw sentiment proxies. Closed-end mutual funds (CEFD) are defined as the year-end, value-weighted average discount on closed-end mutual funds. It is calculated as net asset values (NAV) minus market price divided by NAV times 100. The data on market prices and NAVs are obtained from DataStream and HOSE. TURN is defined as the natural log of turnover. Turnover is the ratio of total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period. NIPO is the annual number of initial public offerings obtained from HOSE. RIPO is measured annually and is defined as the average first-day returns of initial public offerings. CEFD,TURN, NIPO, and ES are lagged 1 year relative to the other two measures. VIX is the natural log of the Chicago Board Options Exchange Market Volatility Index, which is measures the implied volatility of S&P500. CCI is the natural log of the yearly Consumer confidence index, which is based on survey data on consumer's confidence. SENTIMENT is the first principal component of the six sentiment proxies. In panel B, each of the six proxies is regressed on CPI, IPI, GDP, and Central Bank's key policy rate. The orthogonalized proxies, labeled with a "⊥," are the residuals from these regressions. SENTIMENT⊥ is the second principal component of the six orthogonalized proxies.

						Correlations with Sentiment		**Correlations with Sentiment Components**					
	Mean	Median	SD	Min	Max	SENTIMENT	SENTIMENT⊥	CEFD	TURN	NIPO	ES	VIX	CCI
Panel A: Raw Data													
$CEFD_{t-1}$	0.40	0.40	0.10	0.26	0.52	-0.82	-0.76	1					
$TURN_{t-1}$	4.21	4.42	0.61	3.39	4.95	0.35	0.75	-0.60	1				
NIPOt−1	13.80	9.00	10.18	6.00	31.00	1.00	0.79	-0.84	0.40	1			
Est-1	0.79	0.89	0.22	0.40	0.94	-0.92	-0.50	0.68	-0.24	-0.90	1		
VIX_t	3.14	3.08	0.33	2.88	3.69	0.98	0.67	-0.69	0.23	0.97	-0.94	1	
CCIt	4.57	4.58	0.08	4.44	4.66	0.66	0.75	-0.96	0.66	0.69	-0.46	0.49	1
Panel B: Controlling for Macroeconomic Conditions													
$CEFD⊥_{t-1}$	-1E-16	-0.004	0.17	-0.26	0.32	-0.33	-0.40	1					
$TURN⊥_{t-1}$	-3E-15	0.01	0.52	-0.75	0.63	0.42	0.57	0.51	1				
NIPO⊥t-1	-9E-14	2.05	5.90	-7.62	5.40	0.75	1.00	-0.46	0.51	1			
$ES⊥_{t-1}$	-4E-16	-0.003	0.12	-0.17	0.24	-0.34	-0.44	1.00	0.49	-0.50	1		
$VIX⊥_t$	-5E-16	0.0033	0.29	-0.40	0.44	0.76	0.92	-0.19	0.72	0.89	-0.20	1	
CCI⊥t	5.7E-16	-0.005	0.05	-0.06	0.10	0.21	0.13	-0.69	-0.38	0.16	-0.62	0.24	1

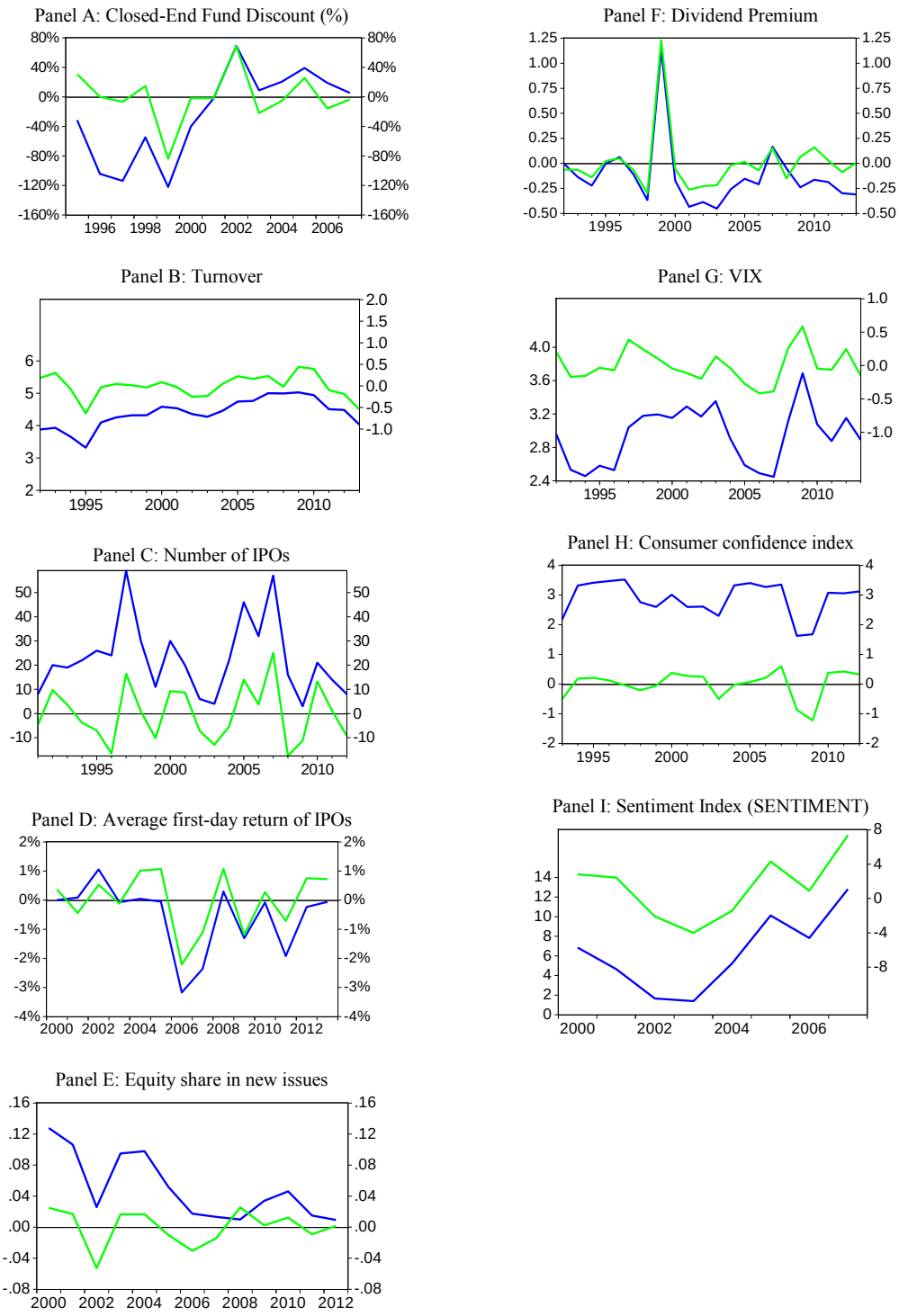

Figure 1A. Investor sentiment, Norway, 1991–2013. Panel A presents the year-end, value-weighted average discount on closed-end mutual funds. The data on market prices and NAVs are obtained from DataStream and Oslo Bors. Panel B plots the log turnover. Turnover is the ratio of total value of shares traded during the period divided by the average market capitalization for the period. Panel C presents the annual number of initial public offerings obtained from OBI. Panel D presents the average annual first-day returns of initial public offerings. Panel E presents as the proportion of aggregate equity issuance in aggregate equity and debt issuance published annually by Oslo Bors. Panel F presents the year-end log ratio of the equal-weighted average market-to-book ratios after sorting all securities on OBX into payers and nonpayers using raw data from DataStream (Baker and Wurgler 2004). Panel G presents the natural log of the Chicago Board Options Exchange Market Volatility Index (VIX), which measures the implied volatility of S&P500. Panel H presents the natural log of the yearly Consumer confidence index, which is based on survey data on consumer's confidence. The blue line (left axis) is raw data. Each measure are regressed on the CPI, IPI, GDP, and Central Bank's key policy rate. The green line (right axis) is the residuals from this regression. The blue line in the final panel is the first principal component of the eight sentiment raw proxies. The green line in the final panel is the first principal component of the eight orthogonalized proxies. Both are standardized to have unit variance. In these two indices, turnover, the average annual first-day return, the dividend premium, and VIX are lagged 1 year relative to the other four proxies.

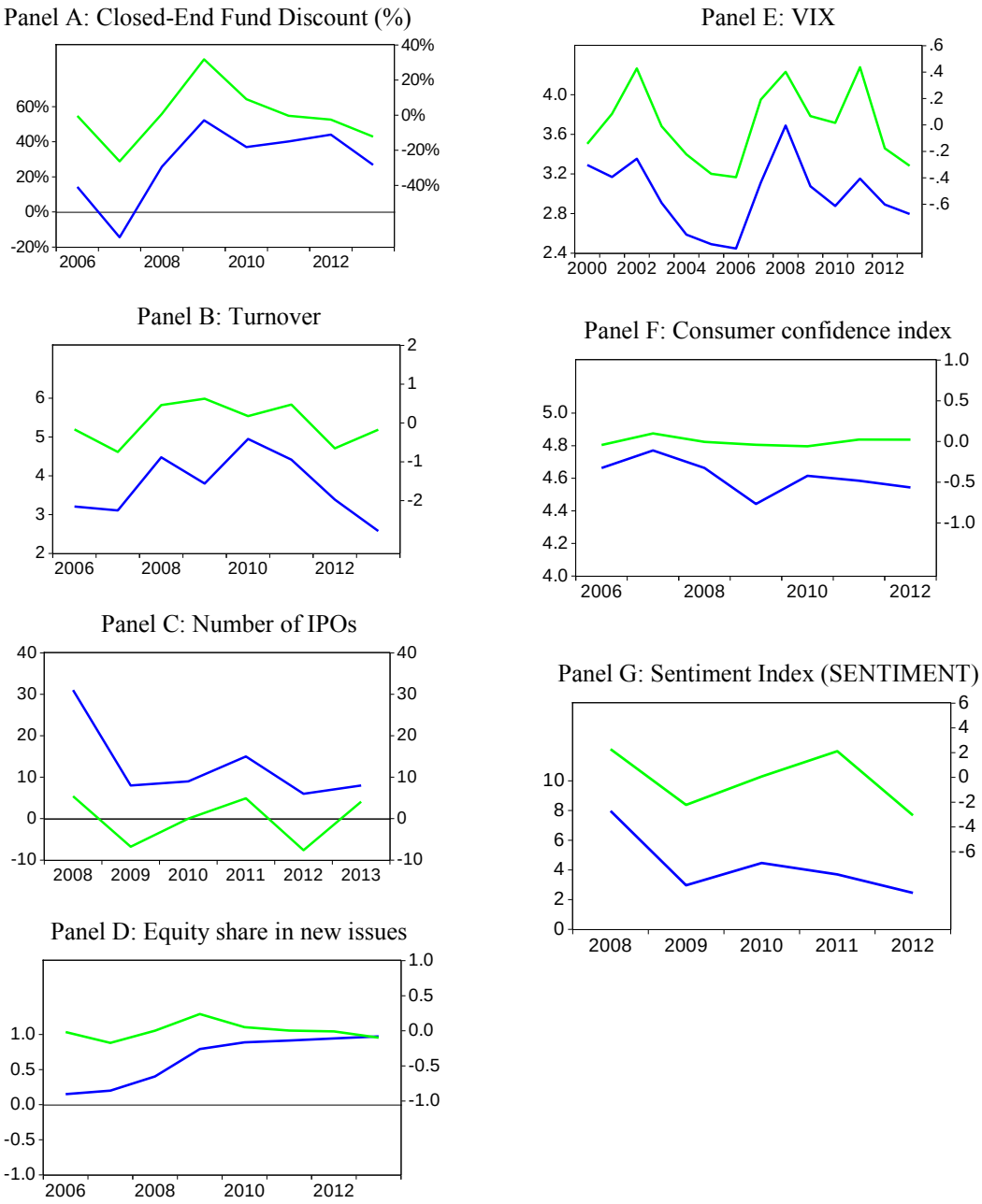

Figure 1B. Investor sentiment, Vietnam, 2000–2013. Panel A presents the year-end, value-weighted average discount on closed-end mutual funds. The data on market prices and NAVs are obtained from DataStream and HOSE. Panel B plots the log turnover. Turnover is the ratio of total value of shares traded during the period divided by the average market capitalization for the period. Panel C presents the annual number of initial public offerings obtained from HOSE. Panel D presents as the proportion of aggregate equity issuance in aggregate equity and debt issuance published annually by HOSE. Panel E presents the natural log of the Chicago Board Options Exchange Market Volatility Index (VIX), which measures the implied volatility of S&P500. Panel F presents the natural log of the yearly Consumer confidence index, which is based on survey data on consumer's confidence, published quarterly by the Nielsen company. The blue line (left axis) is raw data. Each measure are regressed on the CPI, IPI, GDP, and Central Bank's key policy rate. The green line (right axis) is the residuals from this regression. The blue line in the final panel is the first principal component of the six sentiment raw proxies. The green line in the final panel is the first principal component of the six orthogonalized proxies. Both are standardized to have unit variance. In these two indices, closed-end funds discount, turnover, the annual number of initial public offerings, and the share of equity issuance are lagged 1 year relative to the other two proxies.

4. Empirical Tests

A. Sorting

Table III presents 10 equally-weighted portfolios according to their characteristics of firm size (*ME*), total risk (σ), earnings-to-book ratio (*E/BE*), dividend-to-book ratio (*D/BE*), asset tangibility (*PPE/A*), R&D over assets (*RD/A*), book-to-market ratio (*BE/ME*), and external finance over assets (*EF/A*) and sales growth (*GS*). At the beginning of the month, each monthly return variable is grouped into the decile rank that the characteristic takes, and then according to the level of SENTIMENT$^{\perp}$ at the end of the previous year. Decile 10 represents the largest values of each characteristic whereas decile 1 represents the smallest. For each section, the equally-weighted average monthly return is calculated. Furthermore, each decile portfolio is divided into a positive sentiment group and a negative sentiment group, in which the difference between these two groups are computed in order to look for patterns.

In Table IIIA, The *ME* panel represents the size effect conditional on sentiment. The results for Norway are in line with Baker and Wurgler's (2006) findings that the size effect is apparent when sentiment is low. Particularly, when sentiment$^{\perp}$ is negative, the average return is 6.85% per month for decile 1 and 2,30% for decile 10. When sentiment is positive, the average return is -1.55% per month for decile 1 and -1.31% for decile 10. The difference between the positive and negative sentiment supports Baker and Wurgler's (2006) claim that small stocks are more affected by sentiment, in which the sentiment-return relation is negative. Vietnam's results in Table IIIB are also consistent with the authors' findings. When sentiment is pessimistic, the average return is 2.90% per month for the bottom decile and 0.45% for the top decile. However, here the size effect is also apparent when sentiment is high because the average return is 0.65% per month for the bottom decile and -1.1% for the top decile. Overall, when sentiment is low, future returns are relatively high for small stocks in both Norway and Vietnam. On the contrary, when sentiment is high, the size effect is only evident in Vietnam.

The σ panel shows that the cross-sectional effect of return volatility in Norway is conditional on sentiment. Again, Norway's results are consistent with Baker and Wurlger's findings. When sentiment is positive, high sigma stocks earn

lower returns (-2.99%). When sentiment is negative, they earn higher returns (7.15%). Intuitively, "riskier" stocks are hard to value and difficult to arbitrage, which makes them particularly prone to sentiment fluctuations. Figure 2a and 2b are graphical representations of the results from Table IIIA and Table IIIB. Panel B: σ documents the unconditional average monthly returns across σ deciles (green line), which is basically flat; the average monthly return when sentiment is positive (blue bar), which is declining with risk decile; the average monthly return when sentiment is negative (purple bar), which rises with risk deciles; and the difference in conditional returns (red line). The red line clearly shows that riskier stocks' future returns are more sensitive to sentiment. However, this is not fully the case in Vietnam. When sentiment is high, high sigma stocks earn lower returns (-3.8%). But when sentiment is low, they do not earn higher returns. In fact, they earn lower returns (-0.55%), which means that the sentiment effect on high volatility stocks are only apparent when sentiment is high in Vietnam.

E/BE represents the profitability panel, while *D/BE* represents the dividend panel. Consistent with Baker and Wurgler's findings, when sentiment is high, next year's monthly returns are lower on unprofitable firms (-4.50% and -4.20%) than profitable firms in both Norway and Vietnam, respectively. However, when sentiment is low, unprofitable firms do not earn higher returns. This suggests that the results on profitability characteristics are only consistent with Baker and Wurgler's findings when the sentiment is low. In terms of the dividend characteristic, nonpayers tend to earn relatively lower (higher) returns when the sentiment is high (low) in Norway. In Vietnam, this is only consistent when sentiment is high.

PPE/A represents the tangibility panel under the notion that firms with less tangible assets, i.e. *less PPE/A*, are harder to value because they have more intangible assets, and are therefore more sensitive to sentiment fluctuations. The results from Norway are consistent with prior theory. Specifically, when the sentiment is high, the average returns on the bottom decile are lower than the top decile, i.e. -1.98% versus 0.22%. Whereas, when the sentiment is low, the former is higher than the latter, i.e. 4.54% versus 3.82%. However, the Vietnamese results conform to Baker and Wurgler's (2006) findings only when the sentiment is high. The results for the *RD/A* panel are ambiguous mainly because of the lack of data for both countries.

The book-to-market variable shows intriguing patterns, in which it has some explanatory power. Consistent with Baker and Wurgler (2006), future returns are higher for high *BE/ME* stocks in both Norway and Vietnam. However, the results are inconsistent in terms of the *EF/A* stocks in Norway. In Vietnam, however, when sentiment is low, low *EF/A* stocks have generally higher returns than high *EF/A* stocks. Due to lack of data, the *GS* variable could not be investigated. Appendix 3 compares and summarizes the results.

In general, consistent with Baker and Wurgler's (2006) statement, when beginning-of-period proxies for sentiment are low, future returns are high for small stocks, high volatility stocks, non-dividend-paying stocks, and value stocks.

Table IIIA

Future Returns by Sentiment Index and Firm Characteristics, Norway, 1991-2013

Table III presents the average monthly returns of portfolios sorted by the firm characteristic and the sentiment index. 10 equally-weighted portfolios for each month are established according to their characteristics of firm size (ME), total risk (σ), earnings-to-book ratio (E/BE), dividend-to-book ratio (D/BE), asset tangibility (PPE/A), book-to-market ratio (BE/ME), and external finance over assets (EF/A). Decile 1 represents the smallest whereas decile 10 represents the largest values of each characteristic. Furthermore, according to the level of SENTIMENT⊥ at the end of the previous year, each decile portfolio is divided into a positive sentiment group and a negative sentiment group. The average returns for each portfolio as well as the difference of average returns between two groups in the same portfolio, i.e. positive and negative sentiment groups, are then calculated. Portfolio returns for unprofitable firms and nonpayers are also computed. SENTIMENT⊥ is positive for 2000-2001 and 2005-2007.

			Decile										Comparisons		
	SENTIMENT⊥t-1	≤0	1	2	3	4	5	6	7	8	9	10	10 1	10 5	5 1
ME	Positive		-1.55	-0.80	-2.67	-1.23	-1.75	-1.30	-1.03	-2.37	-1.18	-1.31	0.24	0.44	-0.20
	Negative		6.85	4.87	3.80	3.32	3.84	3.26	3.64	4.54	3.42	2.30	-4.55	-1.54	-3.00
	Difference		-8.39	-5.66	-6.47	-4.54	-5.59	-4.56	-4.67	-6.91	-4.60	-3.61	4.79	1.99	2.80
σ	Positive		-0.52	-1.87	-0.91	-1.29	-1.21	-1.48	-1.74	-1.10	-3.30	-3.00	-2.48	-1.79	-0.69
	Negative		2.49	2.69	3.20	4.51	3.46	3.37	4.26	3.49	4.56	7.15	4.66	3.70	0.97
	Difference		-3.01	-4.56	-4.11	-5.81	-4.67	-4.86	-6.01	-4.59	-7.87	-10.15	-7.14	-5.49	-1.66
E/BE	Positive	-4.50	-1.05	-1.46	-0.84	-0.72	-1.00	0.21	0.53	0.73	1.16	2.97	4.02	3.97	0.05
	Negative	3.41	3.87	2.56	2.64	2.58	3.90	3.42	5.80	4.00	5.17	5.13	1.26	1.23	0.03
	Difference	-7.92	-4.92	-4.02	-3.48	-3.30	-4.90	-3.22	-5.28	-3.27	-4.01	-2.16	2.76	2.74	0.02
D/BE	Positive	-2.23	-0.22	-0.72	-0.56	-0.54	-0.14	-0.52	-0.47	-0.60	-1.24	-1.34	-1.12	-1.20	0.08
	Negative	5.01	3.45	3.20	3.46	3.62	2.66	2.33	2.95	2.19	3.80	3.19	-0.27	0.52	-0.79
	Difference	-7.24	-3.68	-3.93	-4.02	-4.16	-2.81	-2.85	-3.42	-2.78	-5.04	-4.53	-0.85	-1.72	0.87
PPE/A	Positive		-1.98	-1.86	-2.75	-1.72	-1.67	-2.11	-1.60	-1.16	-1.76	0.21	2.20	1.88	0.32
	Negative		4.53	3.76	4.81	2.98	2.96	4.05	5.00	5.03	4.21	3.82	-0.72	0.86	-1.58
	Difference		-6.52	-5.63	-7.56	-4.70	-4.62	-6.16	-6.61	-6.19	-5.97	-3.60	2.92	1.02	1.90
BE/ME	Positive		-8.52	-2.03	-2.12	-2.13	-1.29	-1.35	-0.50	0.17	-0.44	0.04	8.55	1.33	7.22
	Negative		-3.27	3.83	2.57	4.15	3.61	3.89	4.53	4.39	5.88	6.06	9.33	2.45	6.88
	Difference		-5.25	-5.86	-4.69	-6.28	-4.91	-5.24	-5.03	-4.22	-6.32	-6.02	-0.77	-1.12	0.35
EF/A	Positive		-2.01	-1.15	-1.86	-1.88	-2.22	-0.97	-1.62	-1.79	-2.03	-0.46	1.55	1.76	-0.21
	Negative		3.94	4.16	3.36	1.89	4.42	3.81	3.47	3.06	4.69	6.01	2.07	1.59	0.48
	Difference		-5.95	-5.31	-5.21	-3.77	-6.64	-4.77	-5.08	-4.84	-6.72	-6.47	-0.52	0.17	-0.69

Table IIIB

Future Returns by Sentiment Index and Firm Characteristics, Vietnam, 2000-2013

Table III presents the average monthly returns of portfolios sorted by the firm characteristic and the sentiment index. 10 equally-weighted portfolios for each month are established according to their characteristics of firm size (ME), total risk (σ), earnings-to-book ratio (E/BE), dividend-to-book ratio (D/BE), asset tangibility (PPE/A), book-to-market ratio (BE/ME), and external finance over assets (EF/A). Decile 1 represents the smallest whereas decile 10 represents the largest values of each characteristic. Furthermore, according to the level of SENTIMENT⊥ at the end of the previous year, each decile portfolio is divided into a positive sentiment group and a negative sentiment group. The average returns for each portfolio as well as the difference of average returns between two groups in the same portfolio, i.e. positive and negative sentiment groups, are then calculated. Portfolio returns for unprofitable firms and nonpayers are also computed. SENTIMENT⊥ is positive for 2008 and 2010-2011.

			Decile										Comparisons		
	SENTIMENT⊥t-1	≤0	1	2	3	4	5	6	7	8	9	10	10 1	10 5	5 1
ME	Positive		0.65	-1.16	-0.61	-0.41	-1.59	-1.08	-2.51	-1.53	-1.54	-1.10	-1.75	0.49	-2.25
	Negative		2.91	1.12	2.04	1.13	0.87	0.70	0.49	-0.01	-0.80	0.45	-2.47	-0.42	-2.05
	Difference		-2.26	-2.28	-2.65	-1.54	-2.46	-1.78	-3.00	-1.52	-0.73	-1.55	0.71	0.91	-0.20
σ	Positive		-0.30	-0.12	-1.25	-1.12	-0.49	-2.49	-1.57	-0.11	-3.66	-3.80	-3.49	-3.31	-0.18
	Negative		2.54	3.16	4.43	3.07	2.59	0.91	0.88	0.60	-0.28	-0.55	-3.08	-3.13	0.05
	Difference		-2.84	-3.27	-5.68	-4.19	-3.07	-3.39	-2.45	-0.70	-3.39	-3.25	-0.41	-0.18	-0.24
E/BE	Positive	-4.19	-3.48	-1.77	-1.72	-0.45	0.26	0.24	2.33	1.33	2.81	0.79	4.27	0.53	3.74
	Negative	-4.04	-3.23	-2.02	-2.45	-1.61	-2.80	-1.92	-1.66	-1.82	0.40	-1.02	2.21	1.78	0.43
	Difference	-0.16	-0.25	0.26	0.73	1.16	3.06	2.16	4.00	3.15	2.42	1.81	2.06	-1.25	3.31
D/BE	Positive	-3.75	-2.23	-1.66	-0.68	-0.83	0.35	0.26	-1.03	-0.86	0.08	1.62	3.85	1.27	2.57
	Negative	-2.76	-1.54	-1.64	-1.24	-1.77	-1.82	-1.47	-1.44	-2.05	-0.84	-2.35	-0.82	-0.53	-0.28
	Difference	-0.99	-0.69	-0.02	0.55	0.93	2.17	1.72	0.41	1.18	0.92	3.97	4.66	1.81	2.86
PPE/A	Positive		-3.02	-1.94	-1.50	-1.31	-0.02	-0.93	-0.88	1.08	-1.67	-0.32	2.71	-0.29	3.00
	Negative		-3.25	-2.36	-1.64	-0.91	-1.22	-1.38	-1.80	-1.32	-2.38	-2.03	1.22	-0.81	2.03
	Difference		0.23	0.42	0.14	-0.41	1.20	0.45	0.92	2.41	0.71	1.72	1.49	0.52	0.97
BE/ME	Positive		-3.55	-3.24	-2.93	-2.61	-2.32	-0.92	-1.48	-0.96	0.47	1.54	5.09	3.87	1.23
	Negative		-3.25	-2.03	-2.13	-0.76	-2.31	-0.87	-0.86	-0.43	1.42	3.87	7.12	6.18	0.94
	Difference		-0.30	-1.21	-0.81	-1.84	-0.01	-0.05	-0.62	-0.53	-0.95	-2.32	-2.03	-2.31	0.29
EF/A	Positive		-0.14	-0.64	-0.55	-0.90	-1.23	-1.11	-3.99	-1.12	-1.72	0.48	0.62	1.71	-1.09
	Negative		-1.11	-2.02	-1.39	-1.99	-1.72	-2.27	-1.71	-1.15	-3.08	-1.93	-0.82	-0.21	-0.61
	Difference		0.97	1.38	0.84	1.09	0.49	1.16	-2.28	0.03	1.36	2.40	1.43	1.91	-0.48

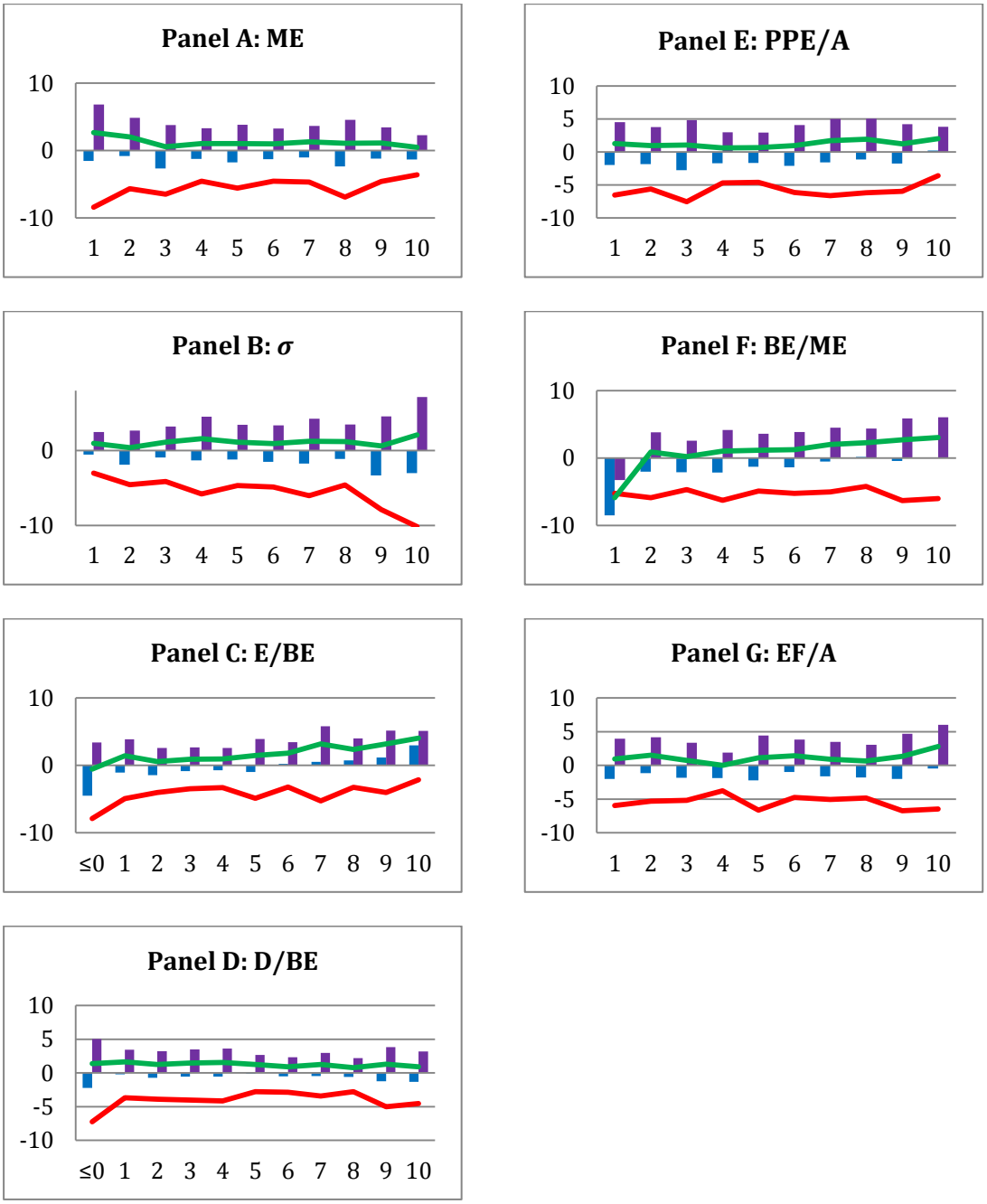

Figure 2A. Sorting approach: Future returns by sentiment index and firm characteristics, Norway, 1963–2001. 10 portfolios are formed based on firm characteristics of firm size (*ME*), total risk, earnings-book ratio (*E*/*BE*), dividend-book ratio (*D*/*BE*), fixed assets (*PPE*/*A*), book-to-market ratio (*BE*/*ME*), and external finance over assets (*EF*/*A*). Portfolio returns are computed for unprofitable, and nonpaying firms. Returns following positive *SENTIMENT*⊥ periods are represented by the blue bars, and returns following negative sentiment periods are presented by the purple bars. The red line is the difference between both periods and the green line is the average. SENTIMENT⊥ is positive for 2000-2001 and 2005-2007.

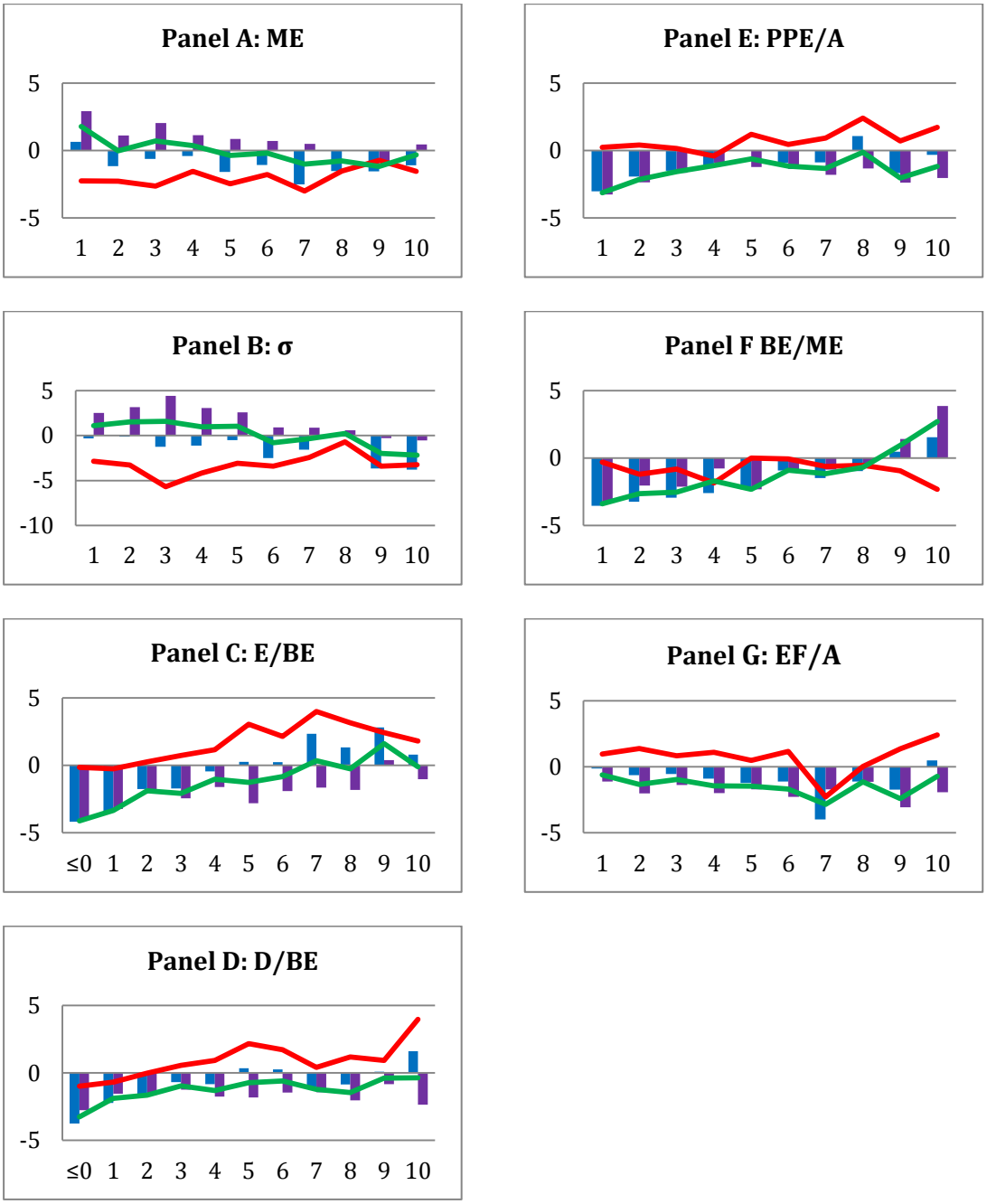

Figure 2B. Sorting Approach: Future returns by sentiment index and firm characteristics, Vietnam, 2000-2013. 10 portfolios are formed based on firm characteristics of firm size (*ME*), total risk, earnings-book ratio (*E*/*BE*), dividend-book ratio (*D*/*BE*), fixed assets (*PPE*/*A*), book-to-market ratio (*BE*/*ME*), and external finance over assets (*EF*/*A*). Portfolio returns are computed for unprofitable, and nonpaying firms. Returns following positive *SENTIMENT*⊥ periods are represented by the blue bars, and returns following negative sentiment periods are presented by the purple bars. The red line is the difference between both periods and the green line is the average. SENTIMENT⊥ is positive for 2008 and 2010-2011.

B. Long–Short Portfolios Regressions

An alternative method that also looks for conditional characteristics effects is the method that forecasts the equally-weighted portfolios using the sentiment. These portfolios are long on stocks with high characteristic values, i.e. the three top deciles, and short on stocks with low values, i.e. the bottom three deciles. Medium is defined as the four middle deciles. This regression approach is of special interest because it permits us to conclude which characteristics have conditional effects that are different from recognized unconditional effects, incorporate the sentiment indexes' continuous nature, and perform formal significance tests.

Table IVA and IVB reports the correlations among characteristics-based long- short portfolios, in which the samples period includes the average monthly returns.

Following Baker and Wurgler (2006), the growth and distress variables are also divided into portfolios of high-minus-medium and medium-minus-low. This is conducted because a simple high-minus-low analysis of the variables would omit important cross-sectional aspects. For instance, in Norway, the portfolios of the BE/ME variable are *negatively* correlated with each other at −0.20, suggesting that high and low BE/ME firms move together relative to middle *BE/ME* firms. Similarly, the medium-minus-low correlation of the variable *EF/A* is −0.31. In Vietnam, however, only the correlation of the portfolios formed according to the variable *BE/ME* is negative at -0.42. The portfolios of the variable *EF/A* are *positively* correlated at 0.40.

In order to test whether sentiment can predict the several long–short portfolios created in Table IVA and IVB, the following regressions have been conducted:

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_1 + \beta SENTIMENT_{t-1} + \varepsilon_{it.}$$

The dependent variable, $R_{Xit=High,t} - R_{Xit=Low,t}$, is the long–short portfolio's monthly return, such as the size effect portfolio (*SMB*). The monthly returns are regressed on the sentiment index, which is lagged one year ($SENTIMENT_{t-1}$).
Also, a multivariate regression is conducted in order to differentiate new predictability effects from well-known co-movement:

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_2 + \beta_1 SENTIMENT_{t-1} + \beta_2 RMRF_t + \beta_3 SMB_t + \beta_4 HML_t + \beta_5 UMD_t + \varepsilon_{it.}$$

Employing the definitions introduced by Fama and French (1993), *RMRF* is defined as the excess return of the value-weighted market less the risk-free rate. This factor controls for the correlation between the returns in each portfolio of individual stocks and the market portfolio returns. In particular, the market portfolio returns for Norway and Vietnam are computed from the Total return index (RI) of OBX SE and VNINDEX. The official risk-free rate for Norway is the 3-month interbank rate. The risk-free rate for Vietnam is base interest rate. All data is obtained from DataStream. The *SMB* variable is calculated as the difference between the returns on small *ME* portfolios and big *ME* portfolios. *HML* is computed as high minus low *BE/ME* stocks. When *SML* or *HML* are the

portfolios being forecasted, they are excluded from the right hand side. The additional factor, *UMD*, is the return on high-minus-low momentum stocks. This factor is calculated as the cumulative return for the 11-month period between 12 and 2 months prior to the given month.

Tables VA and VB present the results from the regressions of the portfolio returns. The size column in Norway demonstrates that when sentiment is high, next year's returns on small stocks are relatively low, and vice versa. For example, the *SMB* coefficient suggests that a one-unit increase in sentiment results in a lower monthly return of −0.43% on the *SMB* portfolio. However, inconsistent with Baker and Wurgler's (2006) findings, the sentiment coefficient *increases* after controlling for *RMRF, SMB, HML*, and *UMD*. This means that the forecasting power of sentiment on stock returns increases after controlling for *RMRF, SMB, HML*, and *UMD*. The results for Vietnam show that when the sentiment is high, the returns on high volatility stocks next year tend to be lower, and vice versa. However, this effect is only apparent for the sentiment index that is not orthogonalized to macroeconomic conditions, ie. The *SENTIMENT index (2).* However, the size effect is evident in $SENTIMENT^{\perp}$ after controlling for *RMRF, SMB, HML*, and *UMD* (-0.60%).

Inconsistent with Baker and Wurgler's (2006) results, the coefficients on *SENTIMENT* and $SENTIMENT^{\perp}$ for both Norway and Vietnam are *not* similar. This implies that macroeconomic conditions play a *major* role in both countries.

In terms of the profitability and dividend payment, regressions are run in order to forecast the difference between the portfolios that are profitable and dividend paying and the portfolios that are unprofitable and nonpaying, respectively. This is because the sorting approach implied that these are expected to capture the key contrasts. In Norway, higher sentiment can forecast *lower* returns on unprofitable stocks. For example, the coefficient of profitability characteristic suggests that a one-unit increase in sentiment results in a lower monthly return of −0.31% on the profitability portfolio. However, the sentiment index in Vietnam does not have a significant forecasting power on these portfolios.

The remaining portfolios show no significant relationship between sentiment and subsequent stock returns.

Since the size effect in Vietnam is only significant at 12%, the sample period is shortened in order to test whether the findings are driven by an overall trend. The subsample period is from 2008 to 2012. Table VI reports that the size effect is more significant at the 11.5% level, and has substantially stronger impact on stock returns than the entire sample.

To summarize, the regressions from Table V partially confirm the significance of the patterns proposed in the sorting approach. In Norway, when sentiment is high, subsequent returns are relatively low for small firms and unprofitable firms. In Vietnam, when sentiment is high, subsequent returns are relatively low for small firms and firms with volatile stock returns. And vice-versa. Generally, the results are consistent with the statement that sentiment has stronger effects on stocks that are hard to value and difficult to arbitrage.

Table IVA

Correlations of Portfolio Returns in Norway, 1991-2013

This table presents the correlations among portfolios that are characteristics-based. The sample period comprises of monthly returns from 1991 to 2013. The long–short portfolios are designed according to firm characteristics: firm size (ME), age, profitability (E), dividends (D), fixed assets (PPE), research and development (RD), book-to-market ratio (BE/ME), and external finance over assets (EF/A). High describes a stock in the top three deciles, low describes a stock in the bottom three deciles, and medium describes a stock in the middle four deciles.

		Size, Risk		Profitability, Dividends		Tangibility		Growth Opportunities & Distress		Growth Opportunities		Distress	
		ME	σ	E	D	PPE/A	RD/A	BE/ME	EF/A	BE/ME	EF/A	BE/ME	EF/A
ME	SMB	1.00											
σ	High-Low	0.07	1.00										
E	>0 - <0	-0.34	-0.48	1.00									
D	>0 - =0	-0.38	-0.62	0.76	1.00								
PPE/A	High-Low	0.03	-0.17	0.35	0.19	1.00							
RD/A	High-Low	-0.32	0.15	0.05	0.03	-0.07	1.00						
BE/ME	HML	-0.22	-0.17	0.43	0.32	0.14	0.40	1.00					
EF/A	High-Low	-0.05	0.37	-0.32	-0.32	-0.19	0.22	0.11	1.00				
BE/ME	Medium-Low	-0.39	-0.08	0.39	0.30	0.16	0.48	0.86	0.21	1.00			
EF/A	High-Medium	-0.01	0.33	-0.31	-0.35	-0.19	0.04	-0.12	0.82	-0.02	1.00		
BE/ME	High-Medium	0.30	-0.18	0.11	0.05	-0.03	-0.12	0.34	-0.18	-0.20	-0.19	1.00	
EF/A	Medium-Low	-0.08	0.06	-0.02	0.05	0.01	0.29	0.36	0.29	0.37	-0.31	0.03	1.00

Table IVB

Correlations of Portfolio Returns in Vietnam, 2000-2013

This table presents the correlations among portfolios that are characteristics-based. The sample period comprises of monthly returns from 2000 to 2013. The long–short portfolios are designed according to firm characteristics: firm size (ME), age, profitability (E), dividends (D), fixed assets (PPE), research and development (RD), book-to-market ratio (BE/ME), and external finance over assets (EF/A). High describes a stock in the top three deciles, low describes a stock in the bottom three deciles, and medium describes a stock in the middle four deciles.

		Size, Risk		Profitability, Dividends		Tangibility	Growth Opportunities & Distress			Growth Opportunities		Distress	
		ME	σ	E	D	PPE/A	BE/ME	EF/A	GS	BE/ME	EF/A	BE/ME	EF/A
ME	SMB	1.00											
σ	High-Low	0.78	1.00										
E	>0 - <0	-0.02	-0.38	1.00									
D	>0 - =0	-0.39	-0.49	0.88	1.00								
PPE/A	High-Low	0.42	0.50	0.52	0.50	1.00							
BE/ME	HML	0.35	0.46	0.16	0.05	0.43	1.00						
EF/A	High-Low	-0.16	0.06	-0.90	-0.83	-0.80	-0.11	1.00					
GS	High-Low	0.18	0.35	-0.45	-0.53	-0.27	0.72	0.60	1.00				
BE/ME	Medium-Low	-0.29	-0.10	0.57	0.73	0.56	0.63	-0.52	0.11	1.00			
EF/A	High-Medium	-0.57	-0.05	-0.62	-0.30	-0.45	0.18	0.70	0.58	0.18	1.00		
BE/ME	High-Medium	0.75	0.66	-0.48	-0.80	-0.15	0.43	0.48	0.70	-0.42	0.00	1.00	
EF/A	Medium-Low	0.08	0.11	-0.84	-0.92	-0.80	-0.24	0.93	0.48	-0.77	0.40	0.62	1.00

Table VA1 and VA2

Time Series Regressions of Portfolio Returns, Norway, 1991 to 2013

This table represents the regressions of long–short portfolio monthly returns on the lagged SENTIMENT index, the market risk premium (RMRF), the Fama–French factors (HML and SMB), and a momentum factor (UMD) in Norway.

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_1 + \beta SENTIMENT_{i,t-1} + \varepsilon_{it.}$$

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_2 + \beta_1 SENTIMENT_{i,\ t-1} + \beta_2 RMRF_t + \beta_3 SMB_t + \beta_4 HML_t + \beta_5 UMD_t + \varepsilon_{it.}$$

The long–short portfolios are sorted based on firm characteristics: firm size (ME), total risk (σ), profitability (E), dividends (D), asset tangibility (PPE/A), book-to-market ratio (BE/ME), and external finance over assets (EF/A). These portfolios are long on stocks with high characteristic values, i.e. the three top deciles, and short on stocks with low values, i.e. the bottom three deciles. Medium is defined as the four middle deciles. Average monthly portfolio returns are matched to the lagged SENTIMENT index for the previous calendar year before controlling for macroeconomic conditions. The first panel presents the results of univariate regressions, whereas the second panel present the results of multivariate regressions after controlling for RMRF, HML, SMD, and UMD. SMB and HML are excluded from the control variables when they are regressed. Coefficients for each variable are presented first and p-values are presented in brackets.

		Size, Risk		Profitability, Dividends		Tangibility		Growth Opportunities & Distress		Growth Opportunities		Distress	
		ME	σ	E	D	PPE/A	RD/A	BE/ME	EF/A	BE/ME	EF/A	BE/ME	EF/A
		SMB	High-Low	>0 - <0	>0 - =0	High-Low	High-Low	HML	High-Low	Med-Low	High-Med	High-Med	Med-Low
Rxit=High,t - Rxit=Low,t = α1 + βSentimentit-1 + εit													
Intercept	**α1**	1.72	-0.33	4.11	0.17	1.76	-1.42	2.60	1.96	0.16	1.54	2.44	0.42
		(0.27)	(0.86)	(0.00)	(0.89)	(0.15)	(0.82)	(0.17)	(0.08)	(0.93)	(0.13)	(0.01)	(0.55)
Sentiment	**β**	-0.19	0.14	-0.22	-0.04	-0.13	-0.20	-0.02	-0.16	0.12	-0.10	-0.13	-0.07
		(0.38)	(0.58)	(0.21)	(0.82)	(0.43)	(0.77)	(0.95)	(0.28)	(0.67)	(0.49)	(0.29)	(0.48)
Rxit=High,t - Rxit=Low,t = α2 + β1Sentimentit-1 + β2RMKT + β3SMB + β4HML + β5UMD + εit													
Intercept	**α2**	2.15	1.51	3.59	-0.78	0.97	-0.48	3.74	1.46	-0.43	1.63	0.43	-0.18
		(0.08)	(0.15)	(0.00)	(0.30)	(0.41)	(0.44)	(0.02)	(0.12)	(0.62)	(0.04)	(0.62)	(0.80)
Sentiment	**β1**	-0.33	0.08	-0.32	-0.06	-0.15	-0.42	-0.23	-0.05	-0.07	0.01	0.07	-0.06
		(0.05)	(0.58)	(0.05)	(0.56)	(0.37)	(0.08)	(0.31)	(0.70)	(0.58)	(0.94)	(0.58)	(0.55)
RMKT	**β2**	-0.22	0.42	-0.33	-0.30	-0.13	-0.36	-0.23	0.08	0.07	0.08	-0.07	0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.09)	(0.33)	(0.02)	(0.19)	(0.20)	(0.12)	(0.20)	(0.97)
SMB	**β3**		0.45	-0.35	-0.50	-0.22	-1.52	-0.54	0.21	-0.27	0.26	0.27	-0.05
			(0.00)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.39)
HML	**β4**	-0.32	-0.26	-0.10	0.13	0.12	-0.33		-0.04	0.76	-0.10	0.24	0.06
		(0.00)	(0.00)	(0.21)	(0.01)	(0.13)	(0.27)		(0.48)	(0.00)	(0.06)	(0.00)	(0.23)
UMD	**β5**	-0.36	-0.25	-0.19	-0.02	-0.08	4.32	0.29	0.06	0.06	0.14	-0.06	-0.08
		(0.00)	(0.00)	(0.05)	(0.79)	(0.38)	(0.42)	(0.02)	(0.40)	(0.42)	(0.03)	(0.42)	(0.15)

Table VA2

		Size, Risk		Profitability, Dividends		Tangibility		Growth Opportunities & Distress		Growth Opportunities		Distress	
		ME	σ	E	D	PPE/A	RD/A	BE/ME	EF/A	BE/ME	EF/A	BE/ME	EF/A
		SMB	High-Low	>0 - <0	>0 - =0	High-Low	High-Low	HML	High-Low	Med-Low	High-Med	High-Med	Med-Low
Rxit=High,t - Rxit=Low,t = α1 + βSentiment⊥it-1 + εit													
Intercept	**α1**	0.65	0.59	2.84	-0.19	1.01	-3.19	2.44	1.17	0.68	1.14	1.75	0.02
		(0.44)	(0.55)	(0.00)	(0.78)	(0.12)	(0.38)	(0.02)	(0.05)	(0.52)	(0.04)	(0.00)	(0.95)
Sentiment⊥	**β**	-0.26	-0.02	-0.11	0.08	-0.06	0.03	0.04	-0.19	0.16	-0.16	-0.12	-0.03
		(0.26)	(0.93)	(0.57)	(0.64)	(0.72)	(0.97)	(0.89)	(0.24)	(0.57)	(0.27)	(0.36)	(0.80)
Rxit=High,t - Rxit=Low,t = α2 + β1Sentiment⊥it-1 + β2RMKT + β3SMB + β4HML + β5UMD + εit													
Intercept	**α2**	0.49	1.93	1.91	-1.09	0.17	0.65	2.60	1.15	-0.79	1.66	0.79	-0.51
		(0.49)	(0.00)	(0.01)	(0.01)	(0.80)	(0.76)	(0.00)	(0.04)	(0.12)	(0.00)	(0.12)	(0.21)
Sentiment	**β1**	-0.43	0.07	-0.31	-0.06	-0.11	-0.11	-0.31	0.01	-0.06	0.04	0.06	-0.02
		(0.02)	(0.68)	(0.10)	(0.61)	(0.54)	(0.85)	(0.21)	(0.92)	(0.65)	(0.78)	(0.65)	(0.85)
RMKT	**β2**	-0.25	0.42	-0.35	-0.30	-0.12	-0.36	-0.25	0.09	0.07	0.08	-0.07	0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.11)	(0.15)	(0.02)	(0.16)	(0.24)	(0.12)	(0.24)	(0.94)
SMB	**β3**		0.45	-0.35	-0.50	-0.21	-0.32	-0.55	0.21	-0.27	0.26	0.27	-0.05
			(0.00)	(0.00)	(0.00)	(0.04)	(0.41)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.44)
HML	**β4**	-0.32	-0.26	-0.10	0.13	0.12	-1.47		-0.04	0.76	-0.10	0.24	0.06
		(0.00)	(0.00)	(0.22)	(0.01)	(0.13)	(0.00)		(0.52)	(0.00)	(0.07)	(0.00)	(0.22)
UMD	**β5**	-0.35	-0.25	-0.19	-0.02	-0.08	-0.31	0.29	0.07	0.06	0.15	-0.06	-0.08
		(0.00)	(0.00)	(0.05)	(0.79)	(0.39)	(0.29)	(0.02)	(0.38)	(0.42)	(0.03)	(0.42)	(0.16)

Table VB1 and VB2

Time Series Regressions of Portfolio Returns, Vietnam, 2000 to 2013

This table represents the regressions of long–short portfolio monthly returns on the lagged SENTIMENT index, the market risk premium (RMRF), the Fama–French factors (HML and SMB), and a momentum factor (UMD) in Vietnam.

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_1 + \beta SENTIMENT_{i,t-1} + \varepsilon_{it.}$$

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_2 + \beta_1 SENTIMENT_{i,t-1} + \beta_2 RMRF_t + \beta_3 SMB_t + \beta_4 HML_t + \beta_5 UMD_t + \varepsilon_{it.}$$

The long–short portfolios are sorted based on firm characteristics: firm size (ME), total risk (σ), profitability (E), dividends (D), asset tangibility (PPE/A), book-to-market ratio (BE/ME), and external finance over assets (EF/A). These portfolios are long on stocks with high characteristic values, i.e. the three top deciles, and short on stocks with low values, i.e. the bottom three deciles. Medium is defined as the four middle deciles. Average monthly portfolio returns are matched to the lagged SENTIMENT index for the previous calendar year before controlling for macroeconomic conditions. The first panel presents the results of univariate regressions, whereas the second panel present the results of multivariate regressions after controlling for RMRF, HML, SMD, and UMD. SMB and HML are excluded from the control variables when they are regressed. Coefficients for each variable are presented first and p-values are presented in brackets.

		Size, Risk		Profitability, Dividends		Tangibility	Growth Opportunities & Distress			Growth Opportunities		Distress
		ME	σ	E	D	PPE/A	BE/ME	EF/A	BE/ME	EF/A	BE/ME	EF/A
			High-	>0 -	>0 -			High-	Med-	High-	High-	
		SMB	Low	<0	=0	High-Low	HML	Low	Low	Med	Med	Med-Low
Rxit=High,t - Rxit=Low,t = α1 + βSentimentit-1 + εit												
Intercept	**α1**	-0.21	-5.27	3.84	2.12	0.97	4.87	-0.52	1.52	0.46	1.28	-0.98
		(0.85)	(0.16)	(0.00)	(0.01)	(0.12)	(0.05)	(0.43)	(0.16)	(0.28)	(0.38)	(0.10)
Sentiment	**β**	0.31	0.80	-0.21	-0.01	-0.07	-1.06	0.07	0.08	0.05	-0.14	0.02
		(0.20)	(0.31)	(0.39)	(0.93)	(0.64)	(0.31)	(0.63)	(0.73)	(0.56)	(0.81)	(0.91)
Rxit=High,t - Rxit=Low,t = α2 + β1Sentimentit-1 + β2RMKT + β3SMB + β4HML + β5UMD + εit												
Intercept	**α2**	-4.24	5.34	-2.00	-1.97	0.55	7.55	1.52	-0.29	1.12	0.29	0.41
		(0.06)	(0.69)	(0.54)	(0.34)	(0.74)	(0.00)	(0.43)	(0.85)	(0.38)	(0.85)	(0.83)
Sentiment	**β1**	0.07	-3.71	0.56	0.36	-0.08	-0.22	0.00	-0.06	-0.01	0.06	0.01
		(0.81)	(0.07)	(0.20)	(0.19)	(0.72)	(0.48)	(0.99)	(0.76)	(0.94)	(0.76)	(0.97)
RMKT	**β2**	-0.25	-0.06	-0.26	-0.26	-0.11	0.38	0.14	-0.08	0.03	0.08	0.11
		(0.01)	(0.93)	(0.08)	(0.01)	(0.16)	(0.00)	(0.12)	(0.22)	(0.61)	(0.22)	(0.19)
SMB	**β3**		-1.92	-0.40	-0.25	0.01		-0.10	-0.04	0.06	0.04	-0.16
			(0.04)	(0.12)	(0.13)	(0.96)		(0.50)	(0.74)	(0.57)	(0.74)	(0.28)
HML	**β4**	0.70	1.63	0.26	0.07	-0.08	0.75	-0.07	0.58	-0.08	0.42	0.02
		(0.00)	(0.13)	(0.29)	(0.64)	(0.54)	(0.00)	(0.65)	(0.00)	(0.38)	(0.00)	(0.90)
UMD	**β5**	-0.01	0.07	0.06	0.01	0.02	0.01	0.14	-0.13	0.01	0.13	0.13
		(0.90)	(0.92)	(0.55)	(0.84)	(0.66)	(0.91)	(0.03)	(0.01)	(0.80)	(0.01)	(0.03)

Table VB2

		Size, Risk		Profitability, Dividends		Tangibility	Growth Opportunities & Distress			Growth Opportunities		Distress
		ME	σ	E	D	PPE/A	BE/ME	EF/A	BE/ME	EF/A	BE/ME	EF/A
			High-	>0 -	>0 -			High-	Med-	High-	High-	Med-
		SMB	Low	<0	=0	High-Low	HML	Low	Low	Med	Med	Low
Rxit=High,t - Rxit=Low,t = α1 + βSentiment⊥it-1 + εit												
Intercept	**α1**	0.93	-2.41	3.06	2.08	0.73	2.12	-0.26	1.78	0.66	0.93	-0.92
		(0.17)	(0.29)	(0.00)	(0.00)	(0.06)	(0.05)	(0.53)	(0.01)	(0.01)	(0.13)	(0.02)
Sentiment⊥	**β**	0.25	0.74	-0.27	0.04	-0.05	-0.53	0.08	-0.21	0.05	-0.04	0.03
		(0.43)	(0.48)	(0.40)	(0.85)	(0.78)	(0.27)	(0.66)	(0.49)	(0.68)	(0.88)	(0.85)
Rxit=High,t - Rxit=Low,t = α2 + β1Sentiment⊥it-1 + β2RMKT + β3SMB + β4HML + β5UMD + εit												
Intercept	**α2**	-2.94	-8.67	0.52	-0.34	-0.35	6.00	1.74	-0.85	0.89	0.85	0.85
		(0.04)	(0.44)	(0.81)	(0.80)	(0.74)	(0.00)	(0.17)	(0.38)	(0.28)	(0.38)	(0.47)
Sentiment	**β1**	-0.60	-2.34	0.74	0.49	0.44	0.27	-0.24	0.20	0.15	-0.20	-0.39
		(0.12)	(0.26)	(0.21)	(0.18)	(0.14)	(0.53)	(0.48)	(0.45)	(0.51)	(0.45)	(0.23)
RMKT	**β2**	-0.21	-0.21	-0.20	-0.22	-0.13	0.33	0.14	-0.10	0.02	0.10	0.12
		(0.01)	(0.78)	(0.13)	(0.01)	(0.05)	(0.00)	(0.07)	(0.11)	(0.66)	(0.11)	(0.10)
SMB	**β3**		-2.50	-0.29	-0.18	0.06		-0.13	-0.02	0.07	0.02	-0.21
			(0.02)	(0.27)	(0.29)	(0.66)		(0.40)	(0.89)	(0.47)	(0.89)	(0.17)
HML	**β4**	0.67	2.33	0.19	0.02	-0.09	0.78	-0.05	0.58	-0.09	0.42	0.04
		(0.00)	(0.04)	(0.44)	(0.89)	(0.45)	(0.00)	(0.71)	(0.00)	(0.34)	(0.00)	(0.79)
UMD	**β5**	-0.04	-0.06	0.03	-0.01	0.05	0.05	0.13	-0.11	0.02	0.11	0.11
		(0.50)	(0.93)	(0.74)	(0.91)	(0.27)	(0.51)	(0.03)	(0.01)	(0.62)	(0.01)	(0.04)

Table VI

Time Series Regressions of Portfolio Returns, Vietnam, Subsample 2009 to 2012

This table represents the regressions of long–short portfolio monthly returns on the lagged orthogonalized SENTIMENT$^{\perp}$ index, the market risk premium (RMRF), the Fama–French factors (HML and SMB), and a momentum factor (UMD) in Vietnam.

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_1 + \beta SENTIMENT^{\perp}_{t-1} + \varepsilon_{it.}$$

$$R_{Xit=High,t} - R_{Xit=Low,t} = \alpha_2 + \beta_1 SENTIMENT^{\perp}_{t-1} + \beta_2 RMRF_t + \beta_3 SMB_t + \beta_4 HML_t + \beta_5 UMD_t + \varepsilon_{it.}$$

The long–short portfolios are sorted based on firm characteristics: firm size (ME), total risk (σ), profitability (E), dividends (D), asset tangibility (PPE/A), book-to-market ratio (BE/ME), and external finance over assets (EF/A). These portfolios are long on stocks with high characteristic values, i.e. the three top deciles, and short on stocks with low values, i.e. the bottom three deciles. Medium is defined as the four middle deciles. Average monthly portfolio returns are matched to the lagged orthogonalized SENTIMENT$^{\perp}$ index for the previous calendar year after controlling for macroeconomic conditions, i.e. CPI, IPI, GDP, and Central Bank's key policy rate. The first panel presents the results of univariate regressions, whereas the second panel present the results of multivariate regressions after controlling for RMRF, HML, SMD, and UMD. SMB and HML are excluded from the control variables when they are regressed. Coefficients for each variable are presented first and p-values are presented in brackets.

		Size, Risk		**Profitability, Dividends**		**Tangibility**	**Growth Opportunities & Distress**			**Growth Opportunities**		**Distress**
		ME	σ	E	D	PPE/A	BE/ME	EF/A	BE/ME	EF/A	BE/ME	EF/A
		SMB	High-Low	>0 - <0	>0 - =0	High-Low	HML	High-Low	Med-Low	High-Med	High-Med	Med-Low
Rxit=High,t - Rxit=Low,t = α2 + β1Sentimentit-1 + β2RMKT + β3SMB + β4HML + β5UMD + εit												
Intercept	**α2**	-3.00	-9.12	0.63	-0.27	-0.28	6.02	1.71	-0.82	0.91	0.82	0.79
		(0.03)	(0.41)	(0.76)	(0.84)	(0.79)	(0.00)	(0.18)	(0.40)	(0.26)	(0.40)	(0.50)
Sentiment	**β1**	-1.15	-4.44	1.38	0.92	0.80	0.53	-0.46	0.37	0.28	-0.37	-0.74
		(0.11)	(0.25)	(0.21)	(0.18)	(0.14)	(0.51)	(0.48)	(0.46)	(0.51)	(0.46)	(0.23)
RMKT	**β2**	-0.21	-0.23	-0.20	-0.22	-0.13	0.33	0.14	-0.10	0.02	0.10	0.12
		(0.01)	(0.76)	(0.13)	(0.01)	(0.05)	(0.00)	(0.07)	(0.11)	(0.65)	(0.11)	(0.10)
SMB	**β3**		-2.51	-0.29	-0.18	0.06	0.78	-0.13	-0.02	0.07	0.02	-0.21
			(0.02)	(0.27)	(0.29)	(0.66)	(0.00)	(0.40)	(0.90)	(0.47)	(0.90)	(0.17)
HML	**β4**	0.67	2.34	0.19	0.02	-0.09		-0.05	0.57	-0.09	0.43	0.04
		(0.00)	(0.03)	(0.45)	(0.89)	(0.45)		(0.71)	(0.00)	(0.34)	(0.00)	(0.79)
UMD	**β5**	-0.04	-0.06	0.03	-0.01	0.05	0.05	0.13	-0.11	0.02	0.11	0.11
		(0.50)	(0.93)	(0.75)	(0.91)	(0.27)	(0.51)	(0.03)	(0.01)	(0.62)	(0.01)	(0.04)

C. Investor sentiment indices

In order to examine the robustness of the resulting orthogonalized sentiment index for Norway and Vietnam, several sentiment indices are constructed on the basis of diverse sentiment proxies after controlling for macroeconomic conditions. Specifically, the robustness of the predictability of the Baker and Wurgler's (2006) sentiment index, the predictive power of VIX and CCI will be also examined across stock markets.

Table VIIA and Table VIIB show the correlations among 6 orthogonalized sentiment indices. Firstly, the first-stage index is the first principal component of all lead and lagged proxies, i.e. 16 loadings for Norway and 12 loadings for

Vietnam, respectively. This is considered as the base sentiment index, which reflects most information about investor sentiment. The fit of the remaining indices in capturing investor sentiment is evaluated based on their correlations with the first-stage index. For each market, the remaining indices includes: *(i)* the parsimonious index (the SENTIMENT index (1) and (2)); *(ii)* the orthogonalized index (the SENTIMENT index (3) and (4)); *(iii)* the orthogonalized index excluding VIX; *(iv)* the orthogonalized index excluding CCI; *(v)* and finally the orthogonalized index excluding VIX and CCI, i.e. the Baker and Wurgler's (2006) index.

Table VIIA
Correlations of Sentiment Indices in Norway, 1991-2013

This table presents the correlations among sentiment indices that are constructed in order to test the robustness of the resulting orthogonalized sentiment index for Norway.

$$SENTIMENT_t^{\perp} = 0.006CEFD_t^{\perp} + 0.292TURN_{t-1}^{\perp} + 0.290NIPO_t^{\perp} + 0.127RIPO_{t-1}^{\perp}$$
$$+0.096ES_t^{\perp} + 0.300P_{t-1}^{D-ND\perp} - 0.109VIX_{t-1}^{\perp} + 0.199CCI_t^{\perp}$$

SENTIMENT1 reprsents the first-stage index with 16 loadings. SENTIMENT2 represents the parsimonious index, which includes the 8 lead or lagged proxies that highly correlated with the first-stage index. SENTIMENT3 represents the orthogonalized index after controlling for the macroeconomic conditions. SENTIMENT4 reprsents the orthogonalized index excluding VIX. SENTIMENT5 reprsents the orthogonalized index excluding CCI. SENTIMENT6 reprsents the orthogonalized index excluding VIX and CCI, i.e. the Baker and Wurgler's (2006) index.

	SENTIMENT1	SENTIMENT2	SENTIMENT3	SENTIMENT4	SENTIMENT5	SENTIMENT6
SENTIMENT1	1.00					
SENTIMENT2	0.92	1.00				
SENTIMENT3	0.82	0.92	1.00			
SENTIMENT4	-0.71	-0.83	-0.98	1.00		
SENTIMENT5	0.74	0.83	0.86	-0.84	1.00	
SENTIMENT6	-0.80	-0.90	-0.99	0.99	-0.86	1.00

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Table VIIB

Correlations of Sentiment Indices in Vietnam, 2000-2013

This table presents the correlations among sentiment indices that are constructed in order to test the robustness of the resulting orthogonalized sentiment index for Vietnam.

$$SENTIMENT_t^{\perp} = -0.011CEFD_{t-1}^{\perp} + 0.347TURN_{t-1}^{\perp} + 0.363NIPO_{t-1}^{\perp} - 0.023ES_{t-1}^{\perp} + 0.397VIX_t^{\perp} - 0.006CCI_t^{\perp}$$

SENTIMENT1 reprsents the first-stage index with 12 loadings. SENTIMENT2 represents the parsimonious index, which includes the 6 lead or lagged proxies that highly correlated with the first-stage index. SENTIMENT3 represents the orthogonalized index after controlling for the macroeconomic conditions. SENTIMENT4 reprsents the orthogonalized index excluding VIX. SENTIMENT5 reprsents the orthogonalized index excluding CCI. SENTIMENT6 reprsents the orthogonalized index excluding VIX and CCI, i.e. the Baker and Wurgler's (2006) index.

	SENTIMENT1	SENTIMENT2	SENTIMENT3	SENTIMENT4	SENTIMENT5	SENTIMENT6
SENTIMENT1	1.00					
SENTIMENT2	0.93	1.00				
SENTIMENT3	0.74	0.75	1.00			
SENTIMENT4	0.74	0.75	0.99	1.00		
SENTIMENT5	0.74	0.75	0.99	0.99	1.00	
SENTIMENT6	0.74	o.75	0.99	0.99	0.99	1.00

As a result, *SENTIMENT3,* i.e. the orthogonalized index excluding VIX, and *SENTIMENT5,* i.e. the Baker and Wurgler's (2006) index for Norway, have significant negative correlations with the first-stage index (-0.71 and -0.80), suggesting that these indices fail to reflect investor sentiment in Norway. However, *SENTIMENT4,* i.e. the orthogonalized index excluding *CCI* for Norway, still succeeds to capture investor sentiment with the correlation of 0.74. This may suggest that the predictive power of *VIX* is only significant in Norway, as a developed market. *CCI* as a sentiment proxy can also forecast stock returns in Norway, however, its predictive power is not as strong as *VIX*. In the Vietnamese stock market, the remaining indices lost little information after removing *VIX*, *CCI* and both proxies (0.74).

In general, the robustness check shows that the sentiment indices for Norway are sensitive to the Chicago Board Options Exchange Market Volatility Index (*VIX*) whereas the sentiment indices in Vietnam show no pattern. This suggests that the U.S. sentiment proxy, i.e. *VIX*, plays an important role in constructing the sentiment index in a developed stock market, i.e. Norway, than in an emerging stock market, i.e. Vietnam. Further research on this may provide insights into whether the U.S. investor sentiment has stronger effect on stock returns in developed markets than in emerging markets.

5. Conclusions

Standard finance theories neglect the role of investor sentiment in the cross-section of stock returns. Consistent with Baker and Wurgler's (2006) findings, this study contests this claim and argue that the investor sentiment has significant predictive power in the cross-section of stock returns. Our key findings after conducting a sorting approach are that when beginning-of-period proxies for sentiment are low, future returns are higher for small stocks, high volatility stocks, non-dividend-paying stocks, and value stocks. Furthermore, after conducting a regression approach, our results partially confirm the significance of the patterns proposed in the sorting approach. Particularly in Norway, when sentiment is high, subsequent returns are relatively low for small firms and unprofitable firms. In Vietnam, when sentiment is high, subsequent returns are relatively low for small firms and firms with highly volatile stock returns. And vice-versa. Generally, our results are consistent with the predictions that sentiment has stronger effects on stocks that are hard to value and difficult to arbitrage.

Moreover, a robustness test of the resulting orthogonalized sentiment index for Norway and Vietnam is implemented. Several sentiment indices are constructed on the basis of diverse orthogonalized sentiment proxies. As a result, the robustness test shows that the sentiment indices for Norway are sensitive to the Chicago Board Options Exchange Market Volatility Index (*VIX*) whereas the sentiment indices in Vietnam reveals no pattern. This implies that *VIX*, also known as the U.S. sentiment proxy, plays an important role when constructing the sentiment index in a developed stock market, i.e. Norway, than in an emerging stock market, i.e. Vietnam. *CCI* as a sentiment proxy can also forecast stock returns in Norway, however, its predictive power is not as strong as *VIX*. Further research on this may provide insights into whether the U.S. investor sentiment has a more pronounced effect on stock returns in developed markets than in emerging markets.

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7. Appendices

Appendix 1: Comparison of signs of the sentiment proxies

Proxies	Predicted	Baker and Wurgler (2006)	Norway		Vietnam	
			$SENTIMENT_t$	$SENTIMENT_t^{\perp}$	$SENTIMENT_t$	$SENTIMENT_t^{\perp}$
CEFD	−	−	−	+	−	−
TURN	+	+	+	+	−	+
NIPO	+	+	+	+	+	+
RIPO	+	+	−	+		
ES	+	+	−	+	−	−
$P^{D\text{-}ND}$	−	−	+	+		
VIX	−	−	−	−	+	+
CCI	+	+	+	+	−	−

Appendix 2: Comparison of the lead-lag relationship among sentiment proxies

Proxies	Predicted	Baker and Wurgler (2006)	Norway	Vietnam
CEFD	Lead	Lead	Lead	Lag
TURN	Lead	Lag	Lag	Lag
NIPO	Lag	Lead	Lead	Lag
RIPO	Lead	Lag	Lag	
ES	Lag	Lead	Lead	Lag
$P^{D\text{-}ND}$	Lead	Lag	Lag	
VIX	(Lead)		Lag	Lead
CCI	(Lead)		Lead	Lead

Appendix 3: Comparisons of sentiment effect on firm characteristics

Characteristics	Sentiment	Baker and Wurlger (2006)	Norway	Vietnam
ME	+	X	X	✓
	-	✓	✓	✓
σ	+	✓	✓	✓
	-	✓	✓	X
E/BE	+	✓	✓	✓
	-	✓	X	X
D/BE	+	✓	✓	✓
	-	✓	✓	X
PPE/A	+	✓	✓	✓
	-	✓	✓	X
BE/ME	+	✓	✓	✓
	-	✓	✓	✓
EF/A	+	✓	X	X
	-	✓	X	✓