The Effect of Price Limits on Value Premium: Evidence from Pakistan Equity Market

Saba Kausar[*], Abdul Rashid[†], Sumra Safdar[‡]

Abstract

The purpose of this study is twofold. The first is to examine the effect of price limits on the stock returns of all manufacturing firms listed on the Pakistan Stock Exchange. The second is to explore the role of price limits in determining the value premium. The study used the Fama-Macbeth cross-sectional regression by taking data for 2000-2020. The results show that stocks with high price limit frequency have substantial value premiums, consistent with the limit-to-arbitrage hypothesis's prediction. Further, a strong relationship exists between price limit and stock returns, resulting in an earnings per share anomaly. Price limits as circuit breakers are helpful for security and exchange commissions to set a price limit based on market volatility and halt trading from a giant price swing. This study also adds to the asset pricing literature by considering the value premium for the Pakistani equity market. The originality lies in its pioneering investigation within a developing economy, contributing unique insights to asset pricing dynamics.

Keywords: price limits, value premium, investor attention, limits-to-arbitrage, information uncertainty

Introduction

The Black Monday crash of October 1987 brought about crashes in all financial markets worldwide. There have been many discussions about the causes of the crash and the ways to prevent future crises. Regularity authorities performed several kinds of research that investigated the causes of the crash and gave recommendations to prevent future crashes. Market regulators also started to consider after the market crash if there was a process that markets should be protected from these devastating losses. According to these studies and reports, the key reason for the crash was the excess volatility caused by trading techniques such

[*]Ph.D. Scholar, Faculty of Management Sciences, International Islamic University, Islamabad Pakistan, Email: saba-arshad@hotmail.com.

[†] Professor & Director General Institute of International Islamic Economics at International Islamic University, Islamabad Pakistan, Email: abdulrashid@iiu.edu.pk

[‡] MS in Economics and Finance from Institute of Islamic Economics International Islamic University, Islamabad Pakistan

as insurance portfolios and arbitrage indexes. Regulatory authorities recommended setting up a circuit breaker in the financial market to avoid future crashes (Gu, 2024). Keqiang Hou, Li, and Zhong (2020) proposed a mechanism such as a circuit breaker to prevent the stock market crash. On the other hand, the opponents of the PL tool argued that the price limit reduces market liquidity by interfering with trading activities. PL often causes problems such as trading interference hypotheses and delays in price discovery because it prevents processes from effectively reaching an equilibrium level. Additionally, the impact of PL on trade decreases market efficiency (E. Fama, 1989; Johansson & Petersson, 2019; Lee, Ready, & Seguin, 1994). According to Kim and Sweeney (2000), PL affects trading activity on non-limit hit days and informs traders to set their trading time by keeping PL in mind. Du (2018) provided a theoretical framework for studying the impact of PL policy implementation on price movement and trading behaviors. S.-Y. Chu, Chan, and Yeh (2019) investigated the effect of PL on market stability, arguing that the previous findings underestimate the endogeneity resulting from market control imposed by regulators to prevent unnecessary market movement where uncertainty is exceptionally high (Gao, Zeng, Sun, & Li, 2023)—all the studies above documented PL's importance, pros, and cons.

By analyzing how investors respond to stock market regulations, Bao, Kalaycı, Leibbrandt, and Oyarzun (2020) and Chou, Chou, Ko, and Chao (2013), they are presented how PL prevents arbitragers from their arbitrage activities that, in turn, leads to possible mispricing. Arbitrage is risky and costly since investors overreact when stocks hit their PL. Indeed, PLHs are highly related to investor attention. According to the limit to arbitrage (LTA) and the limited attention (LA) hypothesis, investors have different assumptions regarding the relationship between limit hit frequency and stock return trends. The previous researchers suggested that when stock is mispriced, arbitragers take advantage due to mispricing.

Consequently, the LTA hypothesis indicates higher asset pricing anomalies for stocks with higher limits. According to LTA theory, investors cannot set prices instantly to fundamental value if they ignore the news and information related to stock. If investors' underreaction to news causes asset pricing anomalies, the return premia of anomalies among stocks with less investor attention should be more pronounced (Sakariyahu, Paterson, Chatzivgeri, & Lawal, 2023). Therefore, the theory of LTA states that the anomalies in asset pricing are adversely associated with limit-hit frequency. Mashruwala, Rajgopal, and Shevlin (2006) identified the accrual anomaly reported by Sloan (1996) (do stock prices altogether represent accrual and cash flow regarding future earnings? The

Accounting analysis focused on businesses with high idiosyncratic uncertainty in stock returns, making it more dangerous for risk-averse arbitragers to take a position in the stock with extreme accruals. In addition, the accrual phenomenon is observed in low-cost and low-volume equities, implying that transaction cost places additional challenges to the exploitation of accrual mispricing.

Volatility hurts the financial system and economy. Many developing countries, especially Pakistan, are facing the problem of high volatility. The importance of an efficient market may be reduced by increased volatility in stock return. Therefore, there is a dire need to explore this phenomenon in the Pakistani context. By examining the connection between price limits, value premiums, and stock returns in the particular context of the Pakistan Stock Exchange, this study closes a significant gap in the body of literature. Through revealing previously unexamined dynamics in a developing economy, the research advances academic understanding while providing useful perspectives for decision-makers and market participants. In Pakistan's changing financial landscape, an understanding of these interactions is essential for making well-informed decisions and implementing sensible regulatory measures The study examines the relationship between LHF and cross-sectional stock return variations in the Pakistan Stock Exchange. When the price limit was initiated, the price limits in the PSX were set to be ± 5%. There is significantly less analysis of PL in developing economies, especially in Pakistan. There is no literature available from Pakistan's perspective regarding the role of PL in determining the value premium and the relationship of the value premium with the stock returns. Policymakers, investors, and businesses operating in markets regulated by price limits can all benefit from the study's theoretical, practical, and managerial implications, which deepen our understanding of how price limits affect stock returns and market dynamics.

The results indicate that earning per share (EPS) is the anomaly in PSX throughout the sample period. At the same time, BM anomaly is significant during the entire period and post-crisis. When we consider LHF, we see that the positive relationship between EPS and stock returns is stronger among those stocks which hit their limit prices more often. This also holds for portfolio analyses. As a result, rather than the limited attention theory, our results support the limit-to-arbitrage theory in explaining the VP in Pakistan.

The remaining paper is organized as follows. Section 2 presents a literature review and Section 3 tells about data and methodology applied. Section 4 gave the critical findings of cross-sectional regression results.

Section 5 concludes the paper by documenting this research's policy implications and future direction.

Literature Review

Prior studies have examined the relationship between PL and volatility. Kim (2001) analyzed the connection between PL and volatility in the stock market and discovered that more restrictive fluctuations in the stock market generally do not decrease during PL. Wei (2002) developed a censored Garch model for asset returns and proposed a Bayesian approach to that model. The importance of the model and estimation method is shown by using Treasury bill futures with high volatility and frequent moves. By testing the overreaction and information hypothesis, Bildik and Elekdag (2004) analyzed the impact of PL on stock return volatility. They found that PL does not affect stock market volatility due to the positive contribution of the mid-day trading halt. PL supporters claim they incentivize investors to analyze market information and make more informed trade decisions. Their results create significant policy consequences for the stock market with PL.

According to Hu (2020), the efficacy of circuit breakers has been widely debated in previous research, but few differentiate between price limits (hereafter, PL) and market-wide circuit breakers (Noh, 2023). A price limit is an upper or lower boundary computed based on a stock's previous day's closing price. Additionally, it helps to reduce the risk of default (Ma, Rao, & Sears, 1989; Moser, 1990) and counter overreaction without interfering with trading activity (Cho, Russell, Tiao, & Tsay, 2003). A study by X. Chu and Qiu (2019) investigated price limit hits (PLHs) and found that PLHs provide significant predictive power for potential volatility. Al Shattarat, Nobanee, and Haddad (2009) and Nobanee, AlShattarat, Haddad, and Al Hajjar (2010) documented that upper PL is related to the company-driven upward movement. However, lower limits are related to market-driven downward movement. This ensures that the laws on PL, in general, effectively avoid unnecessary volatility in stock price that leads to preventing market crashes.

Furthermore, Hsieh and Yang (2009) proposed a censored stochastic volatility mechanism for simulating the PL return series, a popular market stability mechanism. However, Farag (2013) examined the impact of various PL bands on the equity market return and volatility in the stock exchanges in Thailand, Egypt, and Korea. A recent study by X. Chu and Qiu (2019) investigated how PL hits contain information on volatility forecasting and found that PL hits have a considerable predictive power of future volatility. Adcock, Ye, Yin, and Zhang (2019) analyzed

whether PL affects price behavior and volatility and found no indication of volatility reduction after PL hits. Several academic research (E. F. Fama & K. R. French, 1992; E. F. Fama & French, 1993) reveal that firms with high BM ratios earn a higher return than those with a low BM ratio. Imperfection can be seen in the stock market, where unfounded ex-ante and ex-post news impacts are detected. Demand and supply are incompatible, resulting in order imbalances, potentially excessive volatility and a financial market crash. Due to deviations in stock prices, arbitragers are trying to benefit from stock mispricing, as arbitrage is risky and costly. The investor cannot sell their positions because trading on the exchange is suspended when the low-price cap is reached; this can be a nail-biting experience. A trader can suffer losses for several days before adequate liquidity is restored, leading to market inefficiency.

Data and Methodology

Data

This research consists of all manufacturing firms listed on the Pakistan Stock Exchange for 2000-2020. The financial data are obtained from the Financial Statement Analysis of Companies published by the State Bank of Pakistan. The limit hit frequency is the critical variable calculated with the following formula.

$$CapLHF_{i,t} = \frac{number\ of\ days\ with\ price\ limits\ over\ the\ past\ 12\ months\ for\ a\ stock_i}{number\ of\ trading\ days\ over\ the\ past\ 12\ months\ for\ stock_s}$$

Model Specification

To investigate the impact of price limits on stock returns, this study used Fama and MacBeth's cross-sectional approach E. F. Fama and MacBeth (1973). Following cross-sectional regressions for each firm at each month are estimated.

$$R_{i,t} = \alpha_o + \alpha_1\ Beta_{i,t} + \alpha_2 \ln(Size_{i,t}) + \alpha_3 \ln(BM_{i,t}) + \alpha_4\ EP_{i,t} + \alpha_5 \ln(1 + AG_{i,t}) + \alpha_6 GP_{i,t} + \alpha_7\ PR12_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $R_{i,t}$ is the return of stock *i*'s in month t; $Beta_{i,t}$ is estimated from the market model, which is a company's systematic risk. $Size_{i,t}$ is market capitalization; $BM_{i,t}$ is the "book to the market ratio" of the company; $EP_{i,t}$ is the earnings-to-price ratio; $AG_{i,t}$ the growth rate on total assets of

the company; $PR12_{i,t}$ is the cumulative returns of the company over the past 12 months. $\varepsilon_{i,t}$ is the residual part of *i* stock at time *t*.

In this study, seven independent variables are considered to explain stock returns. To estimate systematic risk, we include firm beta (BETA). This study estimates BETA every month using past five-year data to obtain the coefficient from the time-series regression of monthly returns on the PSX over the risk-free rate. We must add firm size and book-to-market (BM) ratio because (E. F. Fama & K. R. French, 1992; E. F. Fama & French, 1998), amongst other research, show two prominent and significant anomalies in the United States and international stock markets. Size is described as the market capitalization of a firm. BM ratio is the book value of equity plus deferred taxes to the estimated equity market value. EPS is the earnings per share ratio to the price at the end of the preceding year. AG is defined as the growth rate of total assets calculated at the end of the prior year. We include AG because studies such as Cooper, Gulen, and Schill (2008) indicate the value of corporate investment for future returns on the stock. Gross profit (GP) is multiplied by the total assets at the end of the preceding year. We also include this because Novy-Marx (2013) suggests that the complementary effect of the value strategy is captured by gross productivity. Lastly, we have the cumulative return Jegadeesh and Titman (1993) presented over the past 12 months to capture the momentum effect. In addition, this study also follows Brennan, Chordia, and Subrahmanyam (1998) method to obtain risk-adjusted returns. This study conducts the following time series regression for each stock i for each month *t*:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,MKT} MKT_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \varepsilon_{i,t} \quad (2)$$

where R_f is the risk-free rate in month *t*, MKT_t is the return on the Pakistan Stock Exchange above the risk-free rate in month *t*, and SMB_t and HML_t are two portfolios based on size and BM in month *t* (E. F. Fama & French, 1993). We estimate the eq. (2) by using past 5-year data up to month *t*-1 with a minimum of 24 observations and describing risk-adjusted return on stock *i and* use the estimates to calculate equation (3) as:

$$R^*_{i,t} \equiv (R_{i,t} - R_{f,t}) - \hat{\beta}_{i,MKT} \lambda MKT_t - \hat{\beta}_{i,SMB} \lambda SMB_t - \hat{\beta}_{i,HML} \lambda HML_t \quad (3)$$

where λMKT_t, λSMB_t, and λHML_t are factors in month-*t*, we substitute $R^*_{i,t}$ in Eq. (1) as the dependent variable.

Results and Discussion

Table 1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Monthly Returns	52489	0.0012	0.8611	-14.7444	13.0271
Firm Beta	51569	0.9815	2.3774	-184.6915	71.5789
ln Market Capitalization	52489	16.238	2.8186	9.7496	33.1764
Book to Market	51875	0.2813	0.8940	-3.5093	32.0756
Earning to Price	51644	0.0735	2.2305	-58.1	233.6429
Growth Rate)	51452	0.0096	0.0956	-3.4762	6.9373
Gross Profit	30924	0.1171	0.2351	-0.8289	8.9463
Cumulative Returns	42323	1.3041	4.6557	0.0079	463.222
Limit Hit Frequency	52489	0.1820	0.1201	0000	2.0000
Idiosyncratic Volatility	52489	0.3417	0.5550	0.1156	4.0928
Turnover	49401	947622.2	11870201	0000	0.0008
Illiquidity	45657	0.0026	0.0323	0000	2.8731
Firm Age	50033	42.0424	17.4724	9.000	158

Note: Table 1 shows the descriptive statistics of core variables of the study.

Table 1 reports the summary statistics of the variables. The mean value of monthly returns is 0.0012, with a standard deviation of 0.8611. The min -14.7444 and max value of 13.0271 show that returns are volatile, with positive and negative values. On average, the value of the firm beta is 0.9815, which is near 1, implying that investment carries the same systematic risk as the market. BM ratio shows a positive mean value of 0.281 and a standard deviation of 0.8940. BM ratio is the indicator of a company's value. The positive value shows that, overall, firms have positive excess returns.

The Existence of the Value Premium

To examine the impact of PL on stock returns, we estimate Fama-Macbeth cross-regressions for January, June, and December anomalies and pre-and-post crises periods. The results are shown in this section. The results for January and non-January are presented in Table 2. The overall results show that the EPS effect exists. Market capitalization is insignificant but positively related to stock returns. The coefficient value of market capitalization is 0.0089, along with the standard error of 0.0029. These results are consistent with the findings of (Chen & Zhang, 1998). The beta coefficient is negative and insignificant related to stock returns in all samples and non-January months. This implies that market risk is not priced in PSX, and the EPS effect does not capture systematic risk.

These findings support the findings of Lin, Ko, Lin, and Yang (2017). According to the prospect theory, a company's attitude in the gain domain would be risk-averse, while its attitude in the loss domain would be risk-seeking. This benefit or loss domain condition will be measured at a reference point. As a result of this phenomenon, the risk and returns are said to be negatively correlated. It is generally believed that the risk-return relationship in developing markets differs from developed ones. According to Fayyad and Daly (2011), volatility in stock prices, unexpected higher returns, serial autocorrelation in returns, leptokurtosis, skewness, and volatility clustering have all been observed in emerging markets.

Table 2: Existence of the Value Premium for January and non-January period

Variables	Raw Returns			Adjusted Returns		
Panel A: Full Period	All	Jan.	Non- Jan.	All	Jan.	Non-Jan.
Firm Beta	-0.0014	0.0134	0.0029	-0.3715***	0.0593	-0.4009***
Market Capitalization	0.0089	-0.0009	-0.0005	0.01389	-0.0421	0.0192
Book-to-Market Ratio	-0.0929***	-0.0057	-0.0955***	-0.2779	0.0228	-0.3063
Earning Price Ratio	-0.0181***	-0.0026	0.0205***	0.4439***	-0.0934	0.4948***
Growth Rate	0.1083*	0.2792***	0.6731***	0.04712	0.6817	-0.0128
Gross Profit	0.0629**	0.1040	0.0746**	1.6723***	0.1956	1.8487***
Cumulative Returns	-0.0255***	-.0548***	-0.0099***	0.0507	-0.0036	0.0559
Constant	-0.1488***	-0.1039	-0.1337***	-1.1116**	0.3759	-1.2522**
Numbers of Obs	24,359	1907	22452	24359	1907	22452
R-squared	0.0846	0.3254	0.0730	0.3866	0.4005	0.3853
F-test	321.60	132.32	253.75	5.36	4.07	5.22
Prob>F	0.000	0.0000	0.0000	0.000	0.0096	0.0000

Note: The table presents the estimation results of the cross-sectional regressions for the full, January, and non-January months. *, **, *** present the significance level for 1%, 5%, and 10% respectively.

Pakistani investors are not well diversified for multiple reasons, including family ownership, a small market, group ownership, and low trading volume. This leads us to believe that systematic and unsystematic risks are essential, so beta underestimates the risk premium. The findings are simple to understand and suggest using raw returns in cross-sectional regression. According to the portfolio theory, the risk-return positively

correlates with the standard. Still, several behavioral finance and prospect theory experiments have shown that risk-return is not positively correlated but negatively correlated. According to standard finance, risk and returns are strongly linked because investors are risk-averse. However, much research on this topic from the behavioral finance perspective has offered an alternative viewpoint. However, according to prospect theory, a company's attitude in the gain domain would be risk-averse, while its attitude in the loss domain would be risk-seeking. This benefit or loss domain condition will be measured concerning a reference point. As a result of this phenomenon, the risk and returns are said to be negatively correlated.

The coefficient of market capitalization shows a positive and insignificant relationship between stock returns and market capitalization. These findings are consistent with E. Fama and K. French (1992) and Farooq and Muddassir (2015). The market capitalization remains insignificant in January and non-January months. Analyses of the term size effect show that stocks of small firms, on average, have higher risk-adjusted returns than those of large firms. However, recent research has discovered that small stocks perform better than large stocks and do not apply to all periods or markets (Al-Rjoub, Varela, & Kabir Hassan, 2005; Dimson & Marsh, 1999).

Furthermore, several studies have discovered that large stocks are correlated with the return premium in a particular market, i.e., a reverse size effect (Wuri, Rachman, Cahyana, Rizal, & Ruseka, 2023). Like many other emerging markets, the Pakistani stock market is plagued by poor corporate governance, market manipulations, and insider trading. Speculative trading is the most common form of investment, with a very short holding period.

According to the findings, the BM ratio has a significant negative relationship with stock returns, consistent with these results (Khan, Gul, Rehman, Razzaq, & Kamran, 2012). The BM ratio remains significant in non-January months but insignificant in January. The vital relation between stock returns and the BM ratio is consistent with Farooq and Muddassir (2015). BM ratio is a risk and returns indicator. The BM ratio is significantly associated with stock returns regardless of risk adjustment. When returns are adjusted, the BM ratio becomes insignificant during all sample periods, irrespective of non-June and non-December months. As a result, the investor is less willing to invest in firms with a negative BM ratio. Investors should consider this during valuations, investments, and other financing decisions. The negative BM ratio is essential for higher returns when investing in the Pakistani stock market. However, it is not

the best option for illustrating a negative stock book to market equity. For this reason, traditional CAPM provides better results.

There is no evidence of the EPS effect in the January sample. Those stocks with higher EPS ratios are undervalued, resulting in a high expected growth rate. In the Full sample, the coefficient value of EPS is 0.0181, which shows a positive and significant relation between stock returns and the EPS ratio. These results are consistent with the findings of (Arslan, Zaman, & Phil, 2014). Previous studies have shown that earnings per share (EPS) substantially positively affects stock returns. This indicates that the higher the firm's EPS, the greater the market-adjusted returns that the firm's stock will generate since a higher EPS means the firm can make more profit for every dollar spent. In our study, the EPS ratio is highly significant across all periods. Therefore, the EPS coefficient remains significant when returns are adjusted by Fama and French (1993) factors. The coefficient value indicates that EPS and stock returns have a direct relationship, i.e., as the EPS increases, the stock return increases, which shows a significant relationship.

Generally, firms in developed capital markets have a more significant asset growth impact than those in developing capital markets. The growth rate is significant at the 10% level using raw returns. The coefficient of AG becomes insignificant when returns are adjusted by Fama French (1993) factors. Another notable finding is that the coefficients of AG are highly significant at any acceptable level during pre-crisis and become insignificant during the post-crisis period. Gonenc and Ursu (2018) also provide evidence that a substantial relationship between AG and stock return in emerging markets holds only for the 2008 crisis rather than the entire period. The AG effect is more potent in developed markets than in developing markets.

This study shows that gross profit (GP) is highly related to stock returns in PSX. The GP coefficient remains significant when returns are adjusted by the Fama and French (1993) factors. Novy-Marx (2013) claims that the GP ratio accurately predicts cross-sectional average returns like the BM ratio. Profitability can detect high returns when considering investors' return demand. This implication is reflected in the fact that if investors expect a higher average return for holding productive assets, the stock prices of those firms should account for less effective assets with lower demanded average returns and represent this in their prices. According to Novy-Marx (2013), profitability indicates a high average return. Many research papers have shown that the average returns of stocks are associated with past performance. In our study, we found a strong momentum effect in PSX by using raw returns. PSX is a stable market

because Pakistan's economy has faced various challenges in the last decade, including terrorism, political uncertainty, and systematic risks such as the earthquake in 2005, floods in 2010, and internal strikes after the 2013 election. However, PSX still exhibits a momentum effect, indicating that it performs well in various times of difficulty and increases the investor's confidence level. The average coefficient on momentum strategy is highly significant across all groups regardless of risk adjustment. The average coefficient of momentum effect becomes insignificant when returns are adjusted by Fama French (1993) factors.

The result of the study found a strong momentum effect in PSX, which is consistent with the findings of Rashid, Fayyaz, and Karim (2019). Based on R-squared values, the model is a good fit. Results show that firm beta and market capitalization are not priced in PSX. The reason for the December anomaly is that December is tax season. Moreover, investors tend to sell loss-making shares near the end of the year to decrease their tax burden. This investing behavior puts downward pressure on stock values. They began repurchasing the shares in January. This exerts upward pressure on stock prices, resulting in a more significant return in January. At the monthly level, the January effect is the most researched anomaly. The January effect was initially documented by Wachtel (1942) and has since been the subject of much empirical research.

Table 3: Existence of the Value Premium for June and non-June period

Variables	Raw Returns			Adjusted Returns		
Panel A: Full Period	All	June.	Non- June.	All	June.	Non-June.
Firm Beta	-0.0014	-0.0239**	0.0015	-0.3715***	-0.9635*	-0.3811***
Market Capitalization	0.00089	0.0215	-0.0007	0.01389	0.1962	0.0188
Book-to-Market Ratio	-0.0929***	0.0215***	-0.0734***	-0.2779	0.1669	-0.1847**
Earning Price Ratio	-0.0181***	-0.4072***	-0.0260	0.4439***	1.8767	2.3867**
Growth Rate	0.1083*	-0.2595	0.1180**	0.04712	-5.3855	0.5019
Gross Profit	0.06296**	0.4096**	0.0465*	1.6723***	3.4074	1.2827***
Cumulative Returns	-0.0255***	-0.1827***	-0.0236***	0.0507	-0.2037	0.0715
Constant	-0.14880***	-0.5901***	-0.0967**	-1.1116**	-3.3335	-0.9932**
Numbers of Obs	24,359	2,122	22,347	24359	2122	22347
R-squared	0.0846	0.2672	0.0693	0.3866	0.3301	0.3756
F-test	321.60	111.48	237.73	5.36	6.33	5.51
Prob>F	0.000	0.0000	0.0000	0.000	0.0014	0.0000

Note: The table shows the existence of the Value Premium for June and non-June periods for raw and adjusted returns

In Table 3, we present the estimation results of the cross-sectional regressions for the full, June, and non-June months. The cross-sectional regression is performed by using both raw and risk-adjusted returns as the dependent variable. The overall findings show the EPS effect in all and non-June sample periods. Market capitalization is insignificant but positively related to stock returns during all sample and June months. This implies that small and young firms' returns are higher than those of big and older firms. In addition, firm beta is only significant in the June anomaly at the 5% level with a coefficient value of -0.0239 and a standard error of 0.0107. Now, turning to the BM ratio, the impact of the BM ratio is highly significant at any acceptable level of significance. Still, it is negatively related to the stock returns in all samples and non-June anomaly but positive in June anomaly. The results of the Fama-Macbeth regression show that market capitalization, growth rate, and momentum effects are all absent in the Pakistan stock exchange.

Table 4: Existence of the Value Premium for Pre-crisis and Post-crisis Period

Variables	Raw Returns			Adjusted Returns		
Panel A: Full Period	All	Pre-crisis	Post-crisis	All	Pre-crisis	Post-crisis
Firm Beta	-0.0014	0.01582**	-0.0017	-0.3715***	-0.0170	-0.6038***
Market Capitalization	0.00089	0.0002	0.0005	0.01389	-0.0706	0.0693*
Book-to-Market Ratio	-0.0929***	-0.0108**	-0.0946***	-0.2779	-0.6926	-0.0061
Earning Price Ratio	-0.0181***	0.0065	-0.0184***	0.4439***	.9285***	0.1264
Growth Rate	0.1083*	0.3402***	0.0784	0.04712	0.0717	0.0310
Gross Profit	0.06296**	0.0273	0.0616**	1.6723***	3.614***	0.3996
Cumulative Returns	-0.0255***	-0.0090	-0.0256***	0.0507	0.1573*	-0.0191
Constant	-0.14880***	-0.0133	-0.1453***	-1.1116**	-0.4798	-1.5258**
Numbers of Obs	24,359	1,067	23,292	-0.3715***	1067	23292
R-squared	0.0846	0.0427	0.0853	24359	0.6865	0.1901
F-test	321.60	7.80	311.21	0.3866	5.95	6.62
Prob>F	0.000	0.0000	0.0000	5.36	0.0000	0.0000

Note: The table presents the estimation results of the cross-sectional regressions for the full, Pre-crisis, and Post-crisis *,**,*** give the significance level for 1%, 5%, and 10%, respectively.

Since our sample covers the pre-crisis and post-crisis periods, in Table 4, the cross-sectional regression is performed using raw returns as

the dependent variable. It presents the estimation results for the total sample, pre-crises, and post-crisis periods. The results show that raw returns, BM, EPS, and cumulative returns are highly significant at any acceptable level during post-crisis and full samples. The results indicate that firm beta has only a substantial and positive relationship with stock return during pre-crisis. Overall, the results show that market capitalization is not present in PSX by using raw returns, and when returns are adjusted, the results show that BM and growth rate are not present in PSX.

Limit Hit Frequency and Value Premium

Portfolio Analyses based on Limit-Hit-Frequency

We examine the relationship between LHF and VP in PSX and present a detailed review of the features of stocks categorized as LHF. *Individual* stocks are divided into three groups based on their monthly LF value. First, cross-sectional averages of variables are calculated. In addition to the variables discussed in this research, we measure average monthly returns in month *t* after calculating LHF and average return volatility of stocks, denoted as sigma. Sigma is the standard deviation of daily returns of stocks over the past 12 months.

We also include several variables in addition to LF. The first variable is related to the limit-to-arbitrage induced by idiosyncratic volatility. Idiosyncratic volatility is measured as the standard deviation of the residual from the subsequent time-series market model for each month, estimated at 36 months of observations ending in the previous month. $R_{i,t} = \beta_{i,1} R_{M,t} + e_{i,t}$, where $R_{i,}$ this stock i's return in month t and $R_{M,t}$ is the return on the PSX in month t. The Second variable is investor attention, driven by the Firm's Turnover. In a standard case without PL, a higher turnover value means a higher degree of investor attention Kewei Hou, Xiong, and Peng (2009), defined as the time-series averages of monthly share trading volume by the total number of outstanding shares over the past 12 months ending in month t-1. We also use the illiquid measure by Amihud and Noh (2021) as the third variable to control the illiquidity effect. We used this variable because the frequency of the price limit may also be related to liquidity. The firm age is the fourth variable because information uncertainty is associated with limit-to-arbitrage (Jiang, Lee, & Zhang, 2005; Lam & Wei, 2011; Zhang, 2006). Age is defined as the number of years a stock has been established.

Over the past 12 months, the average days that stock hits its limit price is 11.1%, 16.7%, and 27.8% for the low, medium, and high LF groups, respectively. Among these, 20.2%, 35.1%, and 52.3% are up-limit

days, while 48.2%, 69.4%, and 78.2% are down-limit days. These findings indicate that down price limits occur more in PSX than up price limits.

Table 5: Cross-Sectional Mean Averages of Variables

LF Group	Full period			Pre-Crises			Post-Crises		
	Low	Median	High	Low	Median	High	Low	Median	High
Limit-Hit-Frequency	0.1114	0.1676	0.2782	0.1147	0.1705	0.3173	0.1102	0.1661	0.2430
Upper-Limit-Frequency	0.2027	0.3513	0.5232	0.1975	0.3549	0.5279	0.2044	0.3495	0.5189
Lower-Limit-Frequency	0.4829	0.6941	0.7829	0.4955	0.6877	0.7529	0.4790	0.6973	0.8101
Monthly Returns	0.0162	0.0231	0.0349	-0.0693	-0.1124	0.0347	0.0433	-0.0290	0.0351
Sigma	0.5543	0.5854	1.1399	0.5263	0.5451	0.5582	0.5590	0.6092	1.3300
Firm Beta	0.0722	0.0826	0.1198	0.0848	0.1201	0.2829	0.0819	0.0944	0.4819
Market Capitalization	17.2698	16.1007	15.8836	15.1783	15.1199	14.9187	18.0153	16.5731	16.5655
Book-to-Market Ratio	0.2506	0.2545	0.2872	0.2268	0.2548	0.2829	0.2219	0.2635	0.3334
Earning-to-Price Ratio	-0.0419	0.1197	0.1186	-0.0444	0.1111	0.1887	-0.0412	0.1241	0.0567
Growth rate	0.0066	0.0088	0.0142	0.0093	0.0111	0.0181	0.0058	0.0076	0.0108
Gross Profit	0.1086	0.1168	0.1296	0.0123	0.1159	0.1248	0.1116	0.1168	0.1301
Cumulative Returns	1.6891	1.1724	1.2402	1.689	1.1724	1.2402	1.9201	1.1946	1.1685
Idiosyncratic Volatility	1.3437	1.3787	1.5773	0.2893	1.2086	1. 2762	1.4594	1.4657	1.6728
Turnover	226736	527830.7	720466	712049.8	770742.3	976531.5	2768039	392590.6	462971.3
Illiquidity	0.0094	0.0139	0.0114	0.0007	0.0009	0.0014	0.0119	0.0207	0.0208
Age	32.3745	32.4895	32.6317	24.74408	26.4081	28.4163	35.0268	35.7833	36.3098

Note: The table shows the main variables' medium, high and low values. The data is divided into pre-cruise and post-cruise periods.

Table 6: The Effect of Limit Hit Frequency on Cross-Sectional Returns for Full Period

Variables	Raw-returns			Fama-French-adjusted returns		
	Low	Median	High	Low	Median	High
Firm Beta	0.0017	0.0004	0.0034	-0.6520***	-0.0752	-0.5418**
	(0.21)	(0.00)	(1.17)	(-3.15)	(-1.18)	(-2.43)
Market Capitalization	0.0109	-0.0048*	-0.0045	0.1265***	-0.0262	0.0483
	(1.12)	(-1.66)	(-1.03)	(2.64)	(-0.41)	(0.55)
Book-to-Market Ratio	-0.986***	-0.0696***	-0.0528***	-1.7445	1.4524	-0.0853
	(-8.81)	(-16.97)	(-7.69)	(-1.56)	(0.28)	(-0.26)
Earning Price Ratio	0.0068	0. 0131***	0.0269 ***	1.5545	0.6658	0.2977***
	(-0.84)	(-9.00)	(-3.53)	(1.53)	(-0.13)	(-2.71)
Growth Rate	0.1999	0.0777	0.0987	-0.3998	-0.1884	0.4841**
	(0.93)	(1.30)	(1.14)	(-0.88)	(-0.36)	(2.38)
Gross Profit	-0.1649**	0.2230	0.0563	0.6327	0.2746	-0.5428
	(-2.02)	(0.82)	(0.69)	(1.24)	(0.46)	(-0.47)
Cumulative Returns	-0.1355***	-0.4754***	-0.0631***	-0.4736***	-0.1101	-0.0242
	(-7.95)	(-41.59)	(-22.90)	(-3.22)	(-1.41)	(-0.21)
Constant	-0.3554**	-0.045	0.0714	-1.9724***	0.3076	-0.6996
	(-2.56)	(-0.11)	(1.14)	(-2.63)	(0.35)	(-0.43)
Numbers of obs	6084	13426	4849	6235	13846	4957
R-squared	0.083	0.138	0.109	0.541	0.491	0.597
F-test	78.112	305.702	84.425	6.548	1.555	2.381
Prob>F	0.000	0.000	0.000	0.000	0.151	0.024

Note: The table presents the estimation results of the cross-sectional regressions separately for subsamples based on LF groups. *,**,*** present the significance level for 1%, 5%, and 10% respectively.

Table 7: The Effect of Limit Hit Frequency on Cross-Sectional Returns for Pre-crisis Period

Variables	Raw-returns			Fama-French-adjusted returns		
	Low	Median	High	Low	Median	High
Firm Beta	0.0088	0.0106	0.0302***	-0.0829***	-0.1479	-0.1119***
	(0.37)	(0.92)	(2.75)	(-3.18)	(-0.64)	(-2.86)
Market Capitalization	-0.0131	-0.0073	-0.0157**	0.1046**	-0.2100	0.1102

	(-0.76)	(-0.87)	(-2.46)	(2.48)	(-0.78)	(1.44)
Book-to-Market Ratio	-0.0288	-0.0287	-0.0329***	-0.1484*	-0.2698	-0.0449
	(-1.23)	(-1.48)	(-4.11)	(-1.97)	(-1.50)	(-0.66)
Earning Price Ratio	0.0031	0.0021	0.0214	0.6049**	0.3332	0.7093**
	(0.42)	(-0.19)	(1.25)	(2.28)	(0.46)	(2.64)
Growth Rate	0.1433	0.9589***	0.2277***	-0.0199	1.2706	0.0345
	(1.35)	(8.55)	(3.54)	(-0.95)	(1.05)	(1.01)
Gross Profit	-0.1768**	0.0065	0.0369	2.0343*	1.9332**	-1.5049
	(-2.09)	(0.23)	(0.43)	(1.75)	(1.99)	(-1.18)
Cumulative Returns	0.0017	-0.0204	-0.0252**	-0.4163***	-0.2127	0.0555
	(0.06)	(-1.31)	(-2.39)	(-2.94)	(-1.05)	(1.27)
Intercept	0.0904	0.0598	0.2550***	-1.968***	2.2885	-1.8192
	(0.39)	(0.60)	(2.63)	(-3.03)	(0.68)	(-1.66)
Numbers of obs	189	457	421	189	457	421
R-squared	0.020	0.149	0.067	0.976	0.935	0.970
F-test	0.536	11.204	4.252	3.890	3.809	3.656
Prob>F	0.807	0.000	0.000	0.003	0.001	0.002

Note: The table presents the estimation results of the cross-sectional regressions separately for subsamples based on LF groups. *,**,*** present the significance level for 1%, 5%, and 10% respectively.

The average monthly returns for the entire sample are 0.0162%, 0.0231%, and 0.0349%, indicating that stocks that hit their limit prices more frequently generate higher returns in general. Other notable findings are that higher LF stocks have higher sigma, lower market capitalization (Size), and higher turnover in all sample periods, suggesting that changes do not influence investors' trading behavior in the price limit rules. Finally, the pattern for Sigma, Turnover, market capitalization, and monthly returns are similar post-crisis. The relationship between LF and firm fundamentals is also worthy of investigation. Higher LF stocks have higher BM ratios and tend to be past winners, i.e., having higher cumulative returns.

Cross-Sectional Regression on Limit-Hit-Frequency

We follow Li and Zhang (2010) by adopting the Fama Macbeth cross-sectional regression separately for subsamples based on LF groups to consider the effect of limit hit frequency on asset pricing anomalies in PSX. Individual stocks are classified into three groups based on the values of LF for each month. The cross-sectional regression is performed within each LF group using raw and risk-adjusted returns as the dependent variable. The findings are presented in Table 8.

Table 8: The Effect of Limit Hit Frequency on Cross-Sectional Returns for Post-Crisis Period

Variables	Raw-returns			Fama-French-adjusted returns		
	Low	Median	High	Low	Median	High
Firm Beta	-0.0004	-0.0006	0.0026	-0.8218***	-0.1361***	-0.4865*
	(-0.05)	(-0.29)	(0.86)	(-3.05)	(-3.38)	(-1.70)
Market Capitalization	0.0214*	-0.0001	0.0017	0.1295*	-0.2470**	-0.1659*
	(1.82)	(-0.00)	(0.30)	(1.76)	(-2.15)	(-1.90)
Book-to-Market Ratio	-0.0885***	-0.0661***	-0.0553***	-0.2225***	-0.1529*	-0.1445
	(-6.89)	(-14.50)	(-6.86)	(-3.42)	(-1.69)	(-1.43)
Earning Price Ratio	0.0093	0. 0131***	0.0268 ***	1.0343	0.4368	4.0383**
	(-1.13)	(-8.86)	(-3.53)	(-1.55)	(-0.97)	(-2.11)
Growth Rate	0.2238	0.0469	0.0378	-0.7364	0.5240	0.2973
	(0.99)	(0.77)	(0.36)	(-1.13)	(1.20)	(1.12)
Gross Profit	-0.6132	-0.0254	-0.0779	2.6010**	0.4527	3.3184
	(-3.16)	(-0.22)	(-0.58)	(2.33)	(0.74)	(1.66)
Cumulative Returns	-0.0136***	-0.0476***	-0.0637***	-0.6829***	0.0655*	-0.1823
	(-7.86)	(-40.97)	(-22.15)	(-3.35)	(1.75)	(-1.14)
Intercept	-0.5077***	-0.0674	-0.0220	-2.337**	2.9990*	2.6305*
	(-3.07)	(-1.29)	(-0.27)	(-2.05)	(1.89)	(1.98)
Numbers of obs	5,895	12,969	4,428	5895	12969	4428
R-squared	0.0821	0.1384	0.1121	0.397	0.234	0.410
F-test	75.25	297.41	79.69	4.261	5.732	2.442
Prob>F	0.0000	0.0000	0.0000	0.000	0.000	0.023

Note: The table presents the estimation results of the cross-sectional regressions separately for subsamples based on LF groups. *,**,*** present the significance level for 1%, 5%, and 10% respectively.

To examine the role of price limit on value premium, we find that EPS is the only variable in all sample periods, even after adjusted returns. When considering LHF, we see the positive relationship between EPS and stock returns even stronger among stocks that hit their limit prices more often. This holds for the portfolio-based analysis as well. Thus, our findings support the limit-to-arbitrage theory in explaining the VP in Pakistan. The first proof of an EPS anomaly was stated by Nicholson (1960), but he did not include risk indicators or risk-adjusted results when comparing portfolios. Since differential returns to EPS strategies are

captured by a combination of size and B/P, E. F. Fama and K. R. French (1992) removed earnings yield from their well-known three-factor model. In two out of thirteen major national markets, the same authors concluded that EPS as a valuable development criterion resulted in the highest value premium as compared to price-to-cash flow (CF/P), Dividend payout ratio(D/P), and Price-to-book ratio(B/P). Even though EPS generated significant value premiums, it did not deliver the best portfolio returns in any of the 13 markets examined. When comparing similarly weighted returns of growth and value portfolios chosen based on EPS, B/P, and D/P rankings based on emerging market stocks, Van der Hart, Slagter, and Van Dijk (2003) found substantial and highest portfolio returns and value premiums for EPS based portfolios.

Some researchers also use BM as an indicator of the value premium. We also find that BM is highly significant in the low, medium, and high LF groups during the total sample. As per Shleifer and Vishny (1997), the BM impact results from the risk related to the volatility of the arbitrage returns, which discourages arbitrage operations. Some researchers argue that why do not experience arbitrageurs take advantage of this opportunity and avoid mispricing if the BM impact reflects mispricing due to systemic bias in expectations? They claim that arbitrage is expensive. In cases where arbitrage cost exceeds arbitrage advantages, systemic mispricing cannot be quickly and thoroughly traded. They also claim that the possibility of arbitrage operations being discouraged by the uncertainty of arbitrage returns is a significant reason for the BM effect. Arbitrageurs are compensated for systematic uncertainty or can eradicate risk by hedging. On the other hand, idiosyncratic volatility cannot be controlled. Furthermore, idiosyncratic volatility contributes to overall portfolio volatility without increasing expected returns because arbitrageurs are not well-diversified.

We also take into account a variety of measures from many explanations in our study. Idiosyncratic and firm age is associated with limit-to-arbitrage. High LF stock tends to have higher idiosyncratic volatility and higher values of healthy age. Ali, Hwang, and Trombley (2003) find that the BM impact is more significant for stocks with higher transaction costs, idiosyncratic volatility, and lower investor sophistication; these results support the market mispricing explanations for the anomaly. Overall, the results show that the existence of EPS, BM, and gross profit effect leads to the value premium in PSX.

Conclusion

To investigate the effect of price limit on stock return, we used raw and risk-adjusted returns to perform a Fama-Macbeth cross-sectional regression for January and non-January, June and non-June, and December and non-December months. The results show that the BM, momentum, gross profit, and EPS effect are present in PSX regardless of risk adjustment. When returns are adjusted, the cumulative returns and growth rate become insignificant across all periods in PSX. Other notable findings are that EPS is the only anomaly across all periods. However, no significant effect of market capitalization is found in PSX across all periods. To examine the role of price limit in determining the value premium, we first classified each stock into three groups depending on the LF group's value. We named low, medium, and high LF portfolios each month and then did Portfolio analyses based on LF. Our findings support Lin et al. (2017) that stocks with higher behavioral characteristics like higher turnover, higher sigma, and smaller size are more likely to hit the limit price. We also find that a lower price limit occurs more often than an up-price limit in PSX. Consistent with the literature, high beta stocks reach their limit prices more frequently.

Furthermore, high LF stocks have higher idiosyncratic volatility, growth rates, and BM ratios. Idiosyncratic and firm age is associated with limit-to-arbitrage. High LF stock tends to have higher idiosyncratic volatility and higher value of healthy age. This result provides a link between the LF and the limit-to-arbitrage hypothesis. These results have important implications for various stock market participants, including investors, managers, academics, and policymakers. Our findings expressly point to portfolio-specific characteristics that are important for investors to consider when making investment decisions. Investors who protect themselves from market short circuits should consider limiting orders. This research is relevant for portfolio managers who indulge in portfolio diversification. Shareholders also seem wary of companies that refuse to reveal enough information or do so in a non-salient manner. As a next step, this study could be further investigated by comparing different countries, examining how people behave in response to PL, and evaluating how regulations and technological advancements are changing the dynamics of the market. It would be beneficial to look into alternate regulatory frameworks and analyze the effects of technological innovations such as high-frequency trading to improve financial market strategies.

References

Adcock, C., Ye, C., Yin, S., & Zhang, D. (2019). Price Discovery and Volatility Spillover with Price Limits in Chinese A-shares Market: A Truncated GARCH Approach. *Journal of the Operational Research Society, 70*(10), 1709-1719.

Al-Rjoub, S. A., Varela, O., & Kabir Hassan, M. (2005). The Size Effect Reversal in the USA. *Applied Financial Economics, 15*(17), 1189-1197.

Al Shattarat, W. K., Nobanee, H., & Haddad, A. E. (2009). Empirical Analysis of Price Limit Hits of Tokyo Stock Exchange. *Journal of International Business & Finance, 1*(1), 41-72.

Ali, A., Hwang, L.-S., & Trombley, M. A. (2003). Arbitrage Risk and the Book-to-Market Anomaly. *Journal of Financial Economics, 69*(2), 355-373.

Amihud, Y., & Noh, J. (2021). Illiquidity and Stock Returns II: Cross-Section and Time-Series Effects. *The Review of Financial Studies, 34*(4), 2101-2123.

Arslan, M., Zaman, R., & Phil, M. (2014). Impact of Dividend yield and Price Earnings Ratio on Stock Returns: A Study non-Financial listed Firms of Pakistan. *Research Journal of Finance and Accounting, 5*(19), 68-74.

Bao, Z., Kalaycı, K., Leibbrandt, A., & Oyarzun, C. (2020). Do Regulations Work? A Comprehensive Analysis of Price Limits and Trading Restrictions in Experimental Asset Markets with Deterministic and Stochastic Fundamental Values. *Journal of Economic Behavior & Organization, 178*, 59-84.

Bildik, R., & Elekdag, S. (2004). Effects of Price Limits on Volatility: Evidence from the Istanbul Stock Exchange. *Emerging Markets Finance and Trade, 40*(1), 5-34.

Brennan, M. J., Chordia, T., & Subrahmanyam, A. (1998). Alternative Factor Specifications, Security Characteristics, and the Cross-Section of Expected Stock Returns. *Journal of Financial Economics, 49*(3), 345-373.

Chen, N. f., & Zhang, F. (1998). Risk and Return of Value Stocks. *The Journal of Business, 71*(4), 501-535.

Cho, D. D., Russell, J., Tiao, G. C., & Tsay, R. (2003). The Magnet Effect of Price Limits: Evidence from High-Frequency Data on Taiwan Stock Exchange. *Journal of Empirical Finance, 10*(1-2), 133-168.

Chou, P.-H., Chou, R. K., Ko, K.-C., & Chao, C.-Y. (2013). What Affects the Cool-Off Duration Under Price Limits? *Pacific-Basin Finance Journal, 24*, 256-278.

Chu, S.-Y., Chan, L. K., & Yeh, J.-H. (2019). The Stabilizing Effects of Price Limits: New Evidence from Jump Contributed Price Variations. *The North American Journal of Economics and Finance, 48,* 529-539.

Chu, X., & Qiu, J. (2019). Forecasting Volatility with Price Limit Hits—Evidence from Chinese Stock Market. *Emerging Markets Finance and Trade, 55*(5), 1034-1050.

Cooper, M. J., Gulen, H., & Schill, M. J. (2008). Asset Growth and the Cross-Section of Stock Returns. *The Journal of Finance, 63*(4), 1609-1651.

Dimson, E., & Marsh, P. (1999). Murphy's Law and Market Anomalies. *The Journal of Portfolio Management, 25*(2), 53-69.

Du, S. (2018). *Analyzing Price Limit Policy Under a Theoretical Framework*. Available at https://repository.upenn.edu/joseph_wharton_scholars/54.

Fama, E. (1989). *Perspective on October 1987, or What did we learn form the crash?* Black Monday and the Future of the Financial Markets, Irwin, Homewood, III.

Fama, E., & French, K. (1992). The Cross Section of Expected Stock Returns. *The Journal of Finance, 47*(2), 427-465.

Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance, 47*(2), 427-465.

Fama, E. F., & French, K. R. (1993). Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics, 33*(1), 3-56.

Fama, E. F., & French, K. R. (1998). Value Versus Growth: The International Evidence. *The Journal of Finance, 53*(6), 1975-1999.

Fama, E. F., & MacBeth, J. D. (1973). Risk, Return, and Equilibrium: Empirical tests. *Journal of Political Economy, 81*(3), 607-636.

Farag, H. (2013). Price Limit Bands, Asymmetric Volatility and Stock Market Anomalies: Evidence from Emerging Markets. *Global Finance Journal, 24*(1), 85-97.

Farooq, S. S.-u.-H. S., & Muddassir, M. (2015). Stock Returns Indicators: Debt to Equity, Book to Market, Firm Size and Sales to Price. *Journal of Poverty, Investment, and Development, 16*, 25-33.

Fayyad, A., & Daly, K. (2011). The Impact of Oil Price Shocks on Stock Market Returns: Comparing GCC Countries with the UK and USA. *Emerging Markets Review, 12*(1), 61-78.

Gao, Q., Zeng, H., Sun, G., & Li, J. (2023). Extreme risk spillover from uncertainty to carbon markets in China and the EU—A time varying copula approach. *Journal of Environmental Management, 326*, 116634.

Gonenc, H., & Ursu, S. (2018). The Asset Growth Effect and Investor Protection in Emerging Markets: The Role of the Global Financial Crisis. *Emerging Markets Finance and Trade, 54*(3), 491-507.

Gu, P. (2024). The Flash Crash: The Impact of High-Frequency Trading on the Stability of Financial Market. *Highlights in Business, Economics and Management, 24*, 1158-1163.

Hou, K., Li, X., & Zhong, W. (2020). Price Limits and Asymmetry of Price Dynamics—High Frequency Evidence From the Chinese Stock Market. *Emerging Markets Finance and Trade, 56*(7), 1447-1461.

Hou, K., Xiong, W., & Peng, L. (2009). A Tale of Two Anomalies: The Implications of Investor Attention for Price and Earnings Momentum. *Available at SSRN 976394*.

Hsieh, P.-H., & Yang, J. J. (2009). A Censored Stochastic Volatility Approach to the Estimation of Price Limit Moves. *Journal of Empirical Finance, 16*(2), 337-351.

Hu, X. (2020). A Theoretical Study of Market Performance under Price Limits and Circuit Breakers in Chinese Stock Market. *Theoretical Economics Letters, 10*(01), 218.

Jegadeesh, N., & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *The Journal of Finance, 48*(1), 65-91.

Jiang, G., Lee, C. M., & Zhang, Y. (2005). Information Uncertainty and Expected Returns. *Review of Accounting Studies, 10*(2-3), 185-221.

Johansson, R., & Petersson, P. (2019). Arbitrage Pricing Theory: A study on the Stockholm Stock.

Khan, M. B., Gul, S., Rehman, S. U., Razzaq, N., & Kamran, A. (2012). Financial Ratios and Stock Return Predictability (Evidence from Pakistan). *Research Journal of Finance and Accounting, 3*(10), 1-6.

Kim, K. A. (2001). Price Limits and Stock Market Volatility. *Economics Letters, 71*(1), 131-136.

Kim, K. A., & Sweeney, R. J. (2000). Effects of Price Limits on Information Revelation: Theory and Evidence. *McDonough School of Business Working Paper, Georgetown University*.

Lam, F. E. C., & Wei, K. J. (2011). Limits-to-Arbitrage, Investment Frictions, and the Asset Growth Anomaly. *Journal of Financial Economics, 102*(1), 127-149.

Lee, C. M., Ready, M. J., & Seguin, P. J. (1994). Volume, Volatility, and New York Stock Exchange Trading Halts. *The Journal of Finance, 49*(1), 183-214.

Li, D., & Zhang, L. (2010). Does q-theory with Investment Frictions Explain Anomalies in the Cross Section of Returns? *Journal of Financial Economics, 98*(2), 297-314.

Lin, C., Ko, K.-C., Lin, L., & Yang, N.-T. (2017). Price limits and the value premium in the Taiwan stock market. *Pacific-Basin Finance Journal, 41*, 26-45.

Ma, C. K., Rao, R. P., & Sears, S. (1989). Limit Moves and Price Resolution: the Case of the Treasury Bond Futures Market. *The Journal of Futures Markets (1986-1998), 9*(4), 321.

Mashruwala, C., Rajgopal, S., & Shevlin, T. (2006). Why is the Accrual Anomaly not Arbitraged Away? The Role of Idiosyncratic Risk and Transaction Costs. *Journal of Accounting and Economics, 42*(1-2), 3-33.

Moser, J. T. (1990). Circuit Breakers, Federal Reserve Bank of Chicago. *Economic Perspectives, 14*, 2-13.

Nicholson, S. F. (1960). Price-Earnings Ratios. *Financial Analysts Journal, 16*(4), 43-45.

Nobanee, H., AlShattarat, W. K., Haddad, A. E., & Al Hajjar, M. (2010). Price Limits and Volatility: a New Approach and Some New Empirical Evidence from the Tokyo Stock Exchange. *Nobanee, H., AlShattarat, WK, Haddad, AE, AlHajjar, MK (2010). Price Limits and Volatility: A New Approach and Some New Empirical Evidence from the Tokyo Stock Exchange. International Research Journal of Finance and Economics, 42*(42), 162-169.

Noh, D. (2023). Do Trading Pauses Protect Retail Investors?

Novy-Marx, R. (2013). The Other Side of Value: The Gross Profitability Premium. *Journal of Financial Economics, 108*(1), 1-28.

Rashid, A., Fayyaz, M., & Karim, M. (2019). Investor Sentiment, Momentum, and Stock Returns: an Examination for Direct and Indirect Effects. *Economic research-Ekonomska istraživanja, 32*(1), 2638-2656.

Sakariyahu, R., Paterson, A., Chatzivgeri, E., & Lawal, R. (2023). Chasing noise in the stock market: an inquiry into the dynamics of investor sentiment and asset pricing. *Review of Quantitative Finance and Accounting*, 1-35.

Shleifer, A., & Vishny, R. W. (1997). A Survey of Corporate Governance. *The Journal of Finance*, *52*(2), 737-783.

Sloan, R. G. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings? *Accounting review*, 289-315.

Van der Hart, J., Slagter, E., & Van Dijk, D. (2003). Stock Selection Strategies in Emerging Markets. *Journal of Empirical Finance*, *10*(1-2), 105-132.

Wei, S. X. (2002). A Censored–GARCH Model of Asset Returns with Price Limits. *Journal of Empirical Finance*, *9*(2), 197-223.

Wuri, W. H., Rachman, V. S., Cahyana, Y., Rizal, D., & Ruseka, F. D. (2023). Effect Of Capitalization And Trading Volume On Stock Returns In The Top 10 Big Caps Stock On The Indonesian Stock Exchange Period 2015–2019. *Adpebi Science Series*, *1*(1), 1-8.

Zhang, X. F. (2006). Information Uncertainty and Stock Returns. *The Journal of Finance*, *61*(1), 105-137.