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Market sentiments and firm-level equity returns: panel evidence of Malaysia

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ABSTRACT

This study focuses on the impact of market sentiment on firm-level equity returns in Malaysia by hypothesising that market sentiment is a relevant risk factor. Understanding how the market sentiment reflects the equity return is crucial to market participants managing their portfolio investment risks. In modelling for firm-level equity return determinants using augmented Fama and French (1992, 1996) three-factor model, this study used data from a sample of 608 publicly listed firms for 2010–2019 and the dynamic panel GMM estimation technique. The findings revealed that market sentiment indices, namely Business Conditions Index (BCI) and Consumer Sentiments Index (CSI), strongly and positively influenced firms equity returns. Excellent market sentiment encouraged a bullish strategy, increasing share prices and, consequently, stock returns. In addition to market sentiment, other related variables, namely domestic market returns, international market returns, small minus big (SMB), high minus low (HML), and firms' liquidity ratio, are also found to be statistically significant in influencing firms equity returns. The policy implication provides a vital strategy to market participants, particularly fund managers and investors, to accordingly manage their risks and returns on their portfolio investment.

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G11; G12; G40; C33; C58

1. Introduction

One of the crucial topics in behavioural finance is the impact of investor sentiment on stock returns. Behavioural finance believes that investors do not always act rationally as they are influenced by various behavioural biases (Rupande et al., 2019). Investors are subject to sentiment, and that there are noise traders or irrational traders who may not apply a company's fundamentals when making investment decisions (Sayim & Rahman, 2015). Although sentiment does impact the activities in the stock

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market and is essential to the stock returns, it remains empirically disputable and theoretically vague (Tuyon et al., 2016). Dow (2011) argued that sentiment as a true risk assessment should not be ignored because market participants depend on belief for their investment decision. Furthermore, Kapoor and Prosad (2017) indicated that besides the fundamental risk, behavioural portfolio theory and behavioural asset pricing models recognise the impact of behavioural biases on investors' decision-making. López-Cabarcos et al. (2020, p. 1) found that 'investor sentiment is related to an efficient market theory and behavioural finance theories'.

Although many studies examine sentiment impact on stock returns, the results are mixed. For example, Baker and Stein (2004), Ben-Rephael et al. (2012), and Abdul et al. (2019) proved a negative relationship. In contrast, Bos and Anderson (1988), Verma and Verma (2007), Fauzias et al. (2014) and Rupande et al. (2019) proved a positive relationship. In addition, these studies concentrated on developed markets, particularly the United States stock markets (Sayim & Rahman, 2015; Danso et al., 2019; Limongi & Ravazzolo, 2019). However, in the context of Malaysia's emerging market, this issue has been subjected to a limited number of studies. A study by Tuyon et al. (2016, p. 65) proved that 'sentiment risks in Malaysia stock market influence all stock returns regardless of firm size and industry groups'. These findings are also related to the evidence that investors in Malaysia are affected by the market sentiment in their investment decision (Statman, 2008; Statman & Weng, 2010). There is still no other unified investor sentiment theory that can justify the investor behaviours regarding short-term and long-term (Burghardt, 2011). For this matter, theorising works need to corroborate identifying sentiment measurement and its relation to human behaviour theory (Baker & Wurgler, 2007; Dow, 2011).

Market sentiment in Malaysia's stock market can be measured using the indices developed by the Malaysian Institute of Economic Research (MIER), which are the Business Conditions Index (BCI) and Consumer Sentiments Index (CSI). The BCI and CSI are generated from Business Conditions Survey, and Consumer Sentiments Survey conducted four times a year by MIER. According to Tuyon et al. (2016), BCI and CSI are measures of market sentiment representing institutional investors, business owners, and consumers that can influence investors' thinking and decision making. Therefore, our central hypothesis is that both market sentiments (BCI and CSI) play a substantial role in affecting the stock market behaviour in Malaysia. An excellent market sentiment generally reflects the positive impact of economic growth and asset allocation in the future. An investor with a bullish sentiment (good sentiment) in the stock market will react positively by buying the shares, thus, increasing share prices and stock return. Therefore, given the hypothesis, this study focuses on providing the latest empirical evidence on the impact of market sentiment on the firm equity returns for 2010 to 2019 by adapting the dynamic panel GMM framework for the Malaysian market.

Given this background, this study potentially contributes to the previous literature in three ways. First, in selecting market sentiment variables, many studies take the indirect approach of sentiment measurement. Examples of such studies include stock market variables (Kurov, 2010), firm-level proxies (Abdul et al., 2019), seasonality effect (Kaplanski & Levy, 2012), natural disasters (Kaplanski & Levy, 2010; Shan &

Gong, 2012), man-made disasters (Drakos, 2010), sporting events (Chang et al., 2012; Curatola et al., 2016), and religious festivities (Białkowski et al., 2012). However, measuring sentiment using these approaches may not truly represent the market sentiment as a whole. Thus, this study employs the well-established indices (BCI and CSI) developed by MIER to proxy the market sentiment in Malaysia. Secondly, although previous studies such as Lau et al. (2002), Shaharudin and Fung (2009), Karim et al. (2011, 2013), and Karim and Zaidi (2015) have proven the determinants of firms equity returns in Malaysia, they have not considered the market sentiment variables. Third, even though Fauzias et al. (2013, 2014) and Tuyon et al. (2016) have similarly adopted the MIER's indices as part of the market sentiment variables for Malaysia, this current study shall improve on it using a more superior technique, namely the Fama and French (1992, 1996) multifactor model within a dynamic panel data setting. This study potentially adds to the increasing works on behavioural finance by filling a gap and proving investor sentiment's impact on the stock market. The study also contributes to the prospective stakeholders, particularly investors and fund managers, to understand further how market sentiment reflects on their portfolio investment decision.

This paper has been organised as follows: Section two summarised the empirical debates on market sentiment upon stock market reaction. In contrast, section three explains the estimation procedures (methodology) and data used to estimate the model. Section four presents the empirical findings, and section five summarises and concludes.

2. Literature review

Market sentiment is also viewed as an investor sentiment because it reveals a movement in financial markets dictated by investors' perception of trades (Limongi & Ravazzolo, 2019). In general, the measurement of investor sentiment can be separated into two groups: direct and indirect measures. The indirect measures such as market-based have been established by Baker and Wurgler (2006; 2007), and another indirect measurement like media-based have been implemented by Tetlock (2007) and Luo et al. (2013). Recent research has also suggested a combination of several sentiment proxies (Tuyon et al., 2016; Rupande et al., 2019; Abdul et al., 2019). The earlier study by Bos and Anderson (1988) stated that the consumer confidence index mainly was a variable used in that time, which proved valuable in the studies of the security prices behaviours.

According to considerable theoretical and findings, investor sentiment has strongly impacted the stock prices, with crucial implications on portfolio and asset management (Sayim & Rahman, 2015). Rational and irrational financial market investors act together. However, Baker and Wurgler (2007) stated that trading actions of the former group could significantly impact the stock prices. Investors' sentiments allegedly affect stock returns as optimism or pessimism may induce mispricing. Optimistic sentiment may push stock prices well above those warranted by underlying fundamental values when investors overvalue asset prices. Brown and Cliff (2005) documented a strong association between sentiment and stock returns in the United States stock

Table 1. Related studies using direct measurement (survey-based) on stock returns.

Sentiment indicators	Author	Market	Data	Methods	Findings/results
• Consumer Confidence Index (CB) • Index of Consumer Sentiment (UM)	Bos and Anderson (1988)	United States	S&P 500 / 1967–1984	Regression	Strong positive relationship between sentiments and S&P prices ($R^2 = 0.95$)
• Market liquidity	Baker and Stein (2004)	United States	NYSE / 1927–1998	Regression / Ordinary least squares (OLS)	Negative relationship found between sentiments and stock returns
• Combination of BCI, CSI, stock market turnover and ASEAN composite FTSE index	Fauzias et al. (2014)	Malaysia	Bursa Malaysia / 1998–2011	Vector error correction model (VEC)	Strong long-run relationship and weak short-run relationship between sentiment and bank deposits.
• Combination of BCI, CSI and stock future index	Tuyon et al. (2016)	Malaysia	Bursa Malaysia / 1996–2014	Autoregressive-Distributed Lag (ARDL)	Sentiment proxies are statistically significant with the stock returns in the long and short-run
• Combination of seven sentiment proxies	Rupande et al. (2019)	South Africa	JSE / 2002–2018	GARCH	Positive connection between sentiment and stock returns volatility
• Combination of volatility premium, turnover and equity share	Abdul et al. (2019)	Pakistan	PSX / 2000–2013	Regression / Augmented Fama-French model	Negative relationship found between sentiment and stock returns

Source: Authors.

market. Chen (2011) further proved a negative relationship between returns and lack of confidence in the US market, indicating that low sentiment is also correlated with low returns. Recent studies have revealed mixed results in different markets related to the correlation of investor sentiment and stock returns. For example, Rupande et al. (2019) found a significant positive connection in the South Africa stock market. Conversely, Abdul et al. (2019) found an important negative connection in the Pakistan stock market. Table 1 summaries results from the relevant past studies.

The majority of past research also studied the effects of sentiment variables in the financial market. However, in Malaysia, Hassan et al. (2016) studied the correlation between investor sentiment and Foreign Direct Investment (FDI). Their main finding revealed a positive bidirectional relationship that surpasses all other macroeconomic variables in terms of impact on the FDI. In comparison, Danso et al. (2019), using the sentiment index produced from the CEO Confidence Survey of the Conference Board Measure from 2004 to 2014, found a positive relationship between market sentiment and firm investment. Interestingly, their findings also supported the role of psychological and cognitive biases in influencing firms' corporate decisions.

Gupta et al. (2017) examined the impact of investor sentiment on the energy market. They found that sentiment produced from OPEC news was a crucial determinant of the US-listed energy firm's financial performance. The finding proves that news on oil production can affect a firm's performance in the developed economy. Giannini et al. (2017) examined sentiment information extracted from a social network to provide helpful investment information for the US stock market. They discovered that non-local sentiment had a much stronger positive relation with contemporaneous information of stock returns and trading volume relative to local sentiment. In China, Zhaohui et al. (2018) adopted multiple regression analysis to examine A-share companies listed in the Shanghai and Shenzhen markets from 2008 to 2012. They proved that listed companies' investor sentiment and investment levels were positively correlated. Pandey and Sehgal (2019) constructed an Investor Sentiment Index and Composite Sentiment Index using the augmented Fama-French three-factor and five-factor models for the Indian market. They established that firm's size is a more complex anomaly that warrants an expanded factor structure model.

In the Malaysian context, Tuyon et al. (2016) studied the impact of investor sentiment on the stock market using a proxy that combines BCI, CSI, and stock index futures (SF). Using the ARDL method, the main findings of this study stated that the investor sentiment influence all stock prices regardless of company size and industry groups. Thus, this provided evidence that Malaysian investors, being in a collectivist society, are affected by sentiment in their investment decision-making (Statman, 2008; Statman & Weng, 2010). Whereby, Fauzias et al. (2013, 2014) also examined Malaysia's investor sentiment using a sentiment index created from a combination of survey and market-data-based proxies. These studies reported a strong positive correlation between sentiment and conventional stock indices.

Against this backdrop, the current study potentially fills some literature gaps in the following ways. First, it augments the Fama-French three-factor model by considering market sentiment variables (BCI and CSI), market benchmark (domestic and international) and firms-specific variables in identifying the determinants factors of firms equity return from the view of an emerging market (namely, Malaysia). Second, this study uses data sourced from 608 publicly listed Bursa Malaysia companies to understand how firm-level equity return responds to market sentiments. Finally, the recent and advanced econometric technique, namely the dynamic panel GMM estimation (short panel), is used to examine how the market sentiment and other controlling factors affect the firms equity return.

3. Methodology and data

As mentioned earlier, the main focus of this study is to investigate the role of market sentiment, namely the Business Conditions Index (BCI) and Consumer Sentiments Index (CSI), on firm-level equity return. In doing so, this study augmented the Fama and French (1992, 1996) three-factor model by adopting dynamic panel data suggested by Karim et al. (2011, 2013), Karim and Zaidi (2015), and Abdul et al. (2019). Accordingly, the standard three-factor model for asset pricing can be summarised as follows:

$$SR_{it} - RF_t = \alpha_0 + \beta_i[MR_t - RF_t] + s_i(SMB_t) + h_i(HML_t) + \varepsilon_{it} \quad (1)$$

In Equation (1), SR is firm stock return, RF is the risk-free rate, α_0 is the constant, MR is market return, β_i is the sensitivity of firm-level excess return to market excess return, s_i is the coefficient for returns of small-equity over big-equity class portfolios in period t (SMB, small minus big), h_i is the coefficient for excess returns of the high over low book-to-market equity class portfolios in period t (HML, high minus low), and ε is the error term. The variables SMB (size variable proxy) and HML (book to market value proxy) will elaborate the functionality of the firm's characteristics relating to the risk factors of an asset.

In examining the role of market sentiment on firms equity return, the Fama and French (1992, 1996) three-factor model is augmented by controlling other essential variables, such as the international and domestic market and firms financial variables. The augmented Fama-French three-factor model has been adopted in many previous studies, for example, Karim et al. (2011, 2013), and Karim and Zaidi (2015). The model for this study in excess return will accordingly be shown as follows:

$$\begin{aligned} SR_{it} - RF_t = {} & \alpha_0 + \beta_1 BCI_t + \beta_2 CSI_t + \beta_3(DMR_t - RF_t) + \beta_4(IMR_t \\ & - IRF_t) + \beta_5(SMB_t) + \beta_6(HML_t) + \beta_7 \ln\left(\frac{DEBT_{i,t-1}}{EQUITY_{i,t-1}}\right) \\ & + \beta_8 \ln\left(\frac{BV_{i,t-1}}{MV_{i,t-1}}\right) + \beta_9 \ln\left(\frac{LIQ_{i,t-1}}{TA_{i,t-1}}\right) + \beta_{10} RSALESG_{i,t-1} + \varepsilon_{it} \end{aligned} \quad (2)$$

In Equation (2), the dependent variable $(SR_{it} - RF_t)$ is the firm-level excess equity return, which is the difference between firm-level equity return (SR) and the risk-free interest rates (RF) proxy by the 12-month Malaysian Treasury Bill rate. The firm equity return is computed as follows:

$$SR_{it} = \left(\frac{CSP_{it} - CSP_{i,t-1}}{CSP_{i,t-1}}\right) + DY_{it} \quad (3)$$

where CSP_{it} is the stock price at year-end for the firm i at time t, the DY_{it} is dividend at the year-end for the firm i at time t.

3.1. Independent variables

For this model, the independent variables (10 factors) are consist of market sentiments (BCI and CSI), market returns (domestic market return, DMR & international market return, IMR), risk factors (SMB & HML), and firms financial variables, namely debt-equity ratio (DEBT/EQUITY), the book-to-market value (BV/MV), liquidity ratio (LIQ/TA), and sales growth (RSALESG).

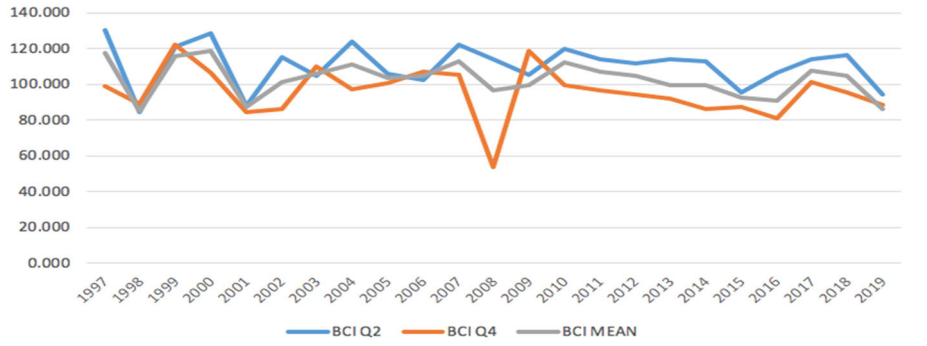

Figure 1. Trend of Business Conditions Index (BCI) 1997–2019.
Source: Malaysian Institute of Economic Research (MIER).

3.2. The market sentiments

The market sentiment index proxies, namely the MIER's Business Conditions Index (BCI) and Consumer Sentiments Index (CSI) have been chosen for this study. This study uses BCI and CSI in the fourth quarter to represent the yearly sentiment. The index variables are based on the Business Conditions Survey and Consumers Sentiments Survey conducted four times a year by MIER. The Business Conditions survey covers over 350 local manufacturing businesses and foreign manufacturing concerns operating in Malaysia, spanning 11 industries. The main survey questionnaire consists of the production level, new order bookings, sales performances, inventory build-up, and new job openings.

The Survey of Consumer Sentiment initiated in January 1987 is a series of surveys conducted quarterly on a sample of over 1200 households in Peninsular Malaysia to gauge consumer spending trends and sentiments. Respondents are queried on their perceptions of their household's current and expected financial positions and employment outlook. Questions are related to respondents' plans to buy houses, new or used cars, and other primary consumer durables goods. The threshold value for both the BCI and CSI indices is 100.

Figure 1 shows the BCI's trend from 1997 to 2019 for the quarter two index (BCI Q2), quarter four index (BCI Q4), and average index points (BCI MEAN). There were dramatic changes in the index's movements during financial crises from 1997 to 1998 and 2007 to 2008. Figure 2 shows the CSI's trend from 1997 to 2019 for the quarter two index (CSI Q2), quarter four index (CSI Q4), and average index points (CSI MEAN). The trend similarly registered a dramatic negative change in the index's movements from 2012 to 2015 due to government fiscal measures, credit tightening measures, and the 1Malaysia Development Berhad (1MDB) scandal. Conversely, the dramatic positive change shown in the second quarter of 2018 was due to the opposition winning Malaysia's 14th General Election (PRU14) for the first time since Independence in 1957. In contrast, however, the index dropped again in 2019 due to the trade war between the US and China. BCI's index points at the end of the year are always lower than at the middle of the year. Additionally, the gap between these two quarters is higher for the BCI compared to the CSI. These figures indicate that business owners always feel more optimistic in predicting business growth for the year as compared to consumers.

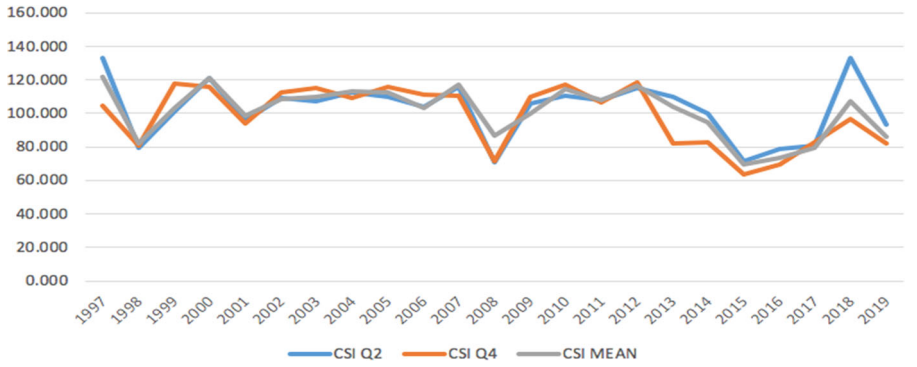

Figure 2. Trend of Consumer Sentiments Index (CSI) 1997–2019.
Source: Malaysian Institute of Economic Research (MIER).

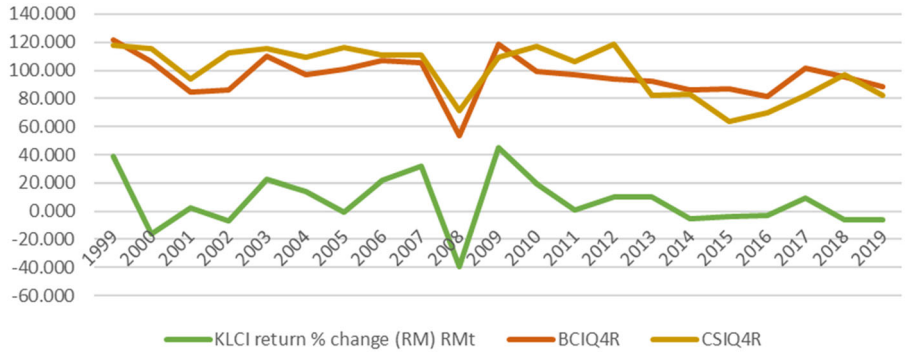

Figure 3. Trend of KLCI return change, BCI, and CSI 1999–2019.
Source: Malaysian Institute of Economic Research (MIER).

Figure 3 shows the KLCI return change and market sentiment trends from 1999 to 2019. It is apparent that market sentiment volatility closely follows the KLCI return change volatility pattern. The BCI index is more similar to the KLCI's return change than the CSI index.

3.3. Market return variables

Both market return variables (domestic and international) have also been expressed in excess return, which is the difference between market equity return and the risk-free interest rates. The 12-month Malaysian Treasury Bill rate represents a risk-free interest rate for the domestic market, whereas the US Treasury bill rate of 12-month is for the international market. The variable of domestic market returns (DMR) is calculated using the return series of the Kuala Lumpur Composite Index (KLCI) as follows:

$$\mathrm{DMR}_t = \left(\frac{\mathrm{KLCI}_t - \mathrm{KLCI}_{t-1}}{\mathrm{KLCI}_{t-1}}\right) \tag{4}$$

The international market return variable is the return series from the US stock market index, namely the Standard & Poor 500 Index, and is calculated as follows:

$$\mathrm{IMR_t} = \left(\frac{\mathrm{SP500_t} - \mathrm{SP500_{t-1}}}{\mathrm{SP500_{t-1}}}\right) \tag{5}$$

The selection of the US stock market to represent the international stock market for this study is reasonable because the US stock market is one of the largest stock markets in the world, and the US investor is currently the primary investor in the Malaysian stock market. Since the local stock market is relatively small and widely open, the movement of the US stock market will thus have a spill-over effect on the Malaysian equity market. The US is also relatively the largest Malaysian trading partner, such that the average exports to the country from 2010 to 2019 were about 10% of the total national exports recorded.

3.4. Risk factors variables

According to Fama and French (1992, 1996), the variables SMB and HML will elaborate on the usefulness of a firm's characteristics in explaining asset returns. The variables are computed as follow:

$$SMB_t = \frac{(\mathrm{SL} + \mathrm{SM} + \mathrm{SH})}{3} - \frac{(\mathrm{BL} + \mathrm{BM} + \mathrm{BH})}{3} \tag{6}$$

$$HML_t = \frac{(\mathrm{SH} + \mathrm{BH})}{2} - \frac{(\mathrm{SL} + \mathrm{BL})}{2} \tag{7}$$

where SMB_t is the difference of return of small and big stocks portfolio at the time t. Whereby, the HML_t is the difference between the high and low book-to-market value return, and both classifications are based on the median values. The BH is the portfolio with a 'big' size and a 'high' ratio of book-to-market value, BL is the portfolio with a 'big' size and a 'low' ratio of book-to-market value, BM is the portfolio with a 'big' size and a 'medium' ratio of book-to-market value, SH is the portfolio with a 'small' size and a 'high' ratio of book-to-market value, SL is the portfolio with a 'small' size and a 'low' ratio of book-to-market value, SM is the portfolio with a 'small' size and a 'medium' ratio of book-to-market value.

3.5. Firms' financial variables

Several firm-specific financial variables, namely debt-equity ratio, liquidity ratio, book-to-market value (BVMV), and the firm's real sales growth, are also considered in formulating the baseline model. All these variables are stated in lagged values since the investors observe the previous market performance when deciding whether to get involved in the market (i.e., to sell or buy the stocks). Thus, the lagged values of these variables are expected to affect the level of stock prices and their stock return. The values of all firm-specific financial variables have been transformed into logarithmic form, except for the real sales growth (RSALESG).

The debt-equity ratio measures the firm's financial leverage, which is essential in determining stock returns. As maintained by Wang et al. (2009), a high ratio will

harm share price because of investors' fears about the firms' capability to pay their loan and interest commitment. In contrast, the book-to-market value (BVMV) ratio is expected to positively affect stock return because a high ratio is a good indicator for stock market efficiency. Liquid assets are essential for marketable securities such as cash in determining stock returns. If firms have high cash holdings, the probability of cash shortage occurring is reduced, thus indicating that the firms are less likely to become bankrupt. We therefore foresee the positive relationship between liquidity ratio and stock returns. As contended by Davis (1994), Lau et al. (2002), Karim et al. (2011, 2013), and Karim and Zaidi (2015), the firm's sales growth also influences the stock return. These sales are stated in real terms (rsales) and calculated by dividing the year-end sales by the consumer price index (CPI). The firm's real sales growth is calculated as follows:

$$\mathrm{RSALESG_{it}} = \left(\frac{\mathrm{rsales_{it}} - \mathrm{rsales_{i,\,t-1}}}{\mathrm{rsales_{i,\,t-1}}}\right) \tag{8}$$

3.6. Dynamic panel data

Some earlier studies, such as Wang et al. (2009), Karim et al. (2011, 2013), and Karim and Zaidi (2015), had contended that past stock returns could affect the current performance of stock returns since the former do hold information about future returns. Thus, the dynamic version of the augmented model, as shown in Equation (2), can be presented as follows:

$$\begin{aligned}\mathrm{R_{it}} - \mathrm{RF_t} = {} & \alpha_0 + \beta_1(\mathrm{R_{it}} - \mathrm{RF_t})_{t-1} + \beta_2\mathrm{BCI_t} + \beta_3\mathrm{CSI_t} + \beta_4(\mathrm{DMR_t} - \mathrm{RF_t}) + \beta_5(\mathrm{IMR_t} \\ & - \mathrm{IRF_t}) + \beta_6(\mathrm{SMB_t}) + \beta_7(\mathrm{HML_t}) + \beta_7 \ln\left(\frac{\mathrm{DEBT_{i,\,t-1}}}{\mathrm{EQUITY_{i,\,t-1}}}\right) \\ & + \beta_8 \ln\left(\frac{\mathrm{BV_{i,\,t-1}}}{\mathrm{MV_{i,\,t-1}}}\right) + \beta_9 \ln\left(\frac{\mathrm{LIQ_{i,\,t-1}}}{\mathrm{TA_{i,\,t-1}}}\right) + \beta_{10}\mathrm{RSALESG_{i,\,t-1}} + \eta_i + \nu_{it}\end{aligned} \tag{9}$$

Equation (9) is the dynamic panel version of the Fama and French (1992, 1996) with added lagged firm's excess stock returns $(\mathrm{R_{it}} - \mathrm{RF_t})_{t-1}$ and the error term $(\varepsilon_{it} = \eta_i + \nu_{it})$. The error term was assumed to follow the one-way error component, where η_i is an unobserved firm-specific time-invariant effect, and ν_{it} is the remainder of the stochastic disturbance term. Additionally, $\eta_i \sim IID\left(0, \sigma_\eta^2\right)$ allows for heterogeneity in the means of the firm return series across individuals, and ν_{it} is assumed to be independent across individuals; thus, $\nu_{it} \sim IID\left(0, \sigma_\nu^2\right)$. The baseline model is estimated using the dynamic panel GMM technique.

Adding the lagged value of firm excess return in the baseline model has produced endogeneity (correlates) with the firm-specific effect in the data generating process. To remove these effects, Blundell and Bond (1998) solved them by using the transformation of forward orthogonal deviation. However, this transformation method will create a new correlation bias between the error terms and lagged dependent variables.

Since the explanatory variables are related to error terms, they can also become endogenous variables.

The explanatory variables can thus be assumed in three ways; as predetermined variables (which are correlated to the past error), as endogenous variables (correlated with past and current error), and strictly as exogenous variables (uncorrelated with the present, past, or future error). Equation (9) that uses a forward orthogonal transformation will be instrumented with the regressors' lagged level. The generalised method-of-moments (GMM) estimator in these conditions is the difference GMM.

However, Blundell and Bond (1998) and Alonso-Borrego and Arellano (1999) argued that the lagged values of difference GMM are weak since the explanatory variables are endless or merely a random walk. This problem exists since the individual effects (η_i) increases relative to the variance of the idiosyncratic error (v_{it}) or as the autoregressive parameter (η) approaches unity. To solve this problem, Blundell and Bond (1998) combine the regressions simultaneously in level form and different forms. The level form equation will be instrumented using differences lagged of corresponding variables; this method is called the system GMM estimation. The dynamic panel of system GMM estimation will therefore be used to investigate the dynamic model of the firm stock returns by focusing on the role of market sentiment.

In analysing the impact of market sentiment on firm-level equity return, both one-step estimation and two-step estimations will be conducted. As argued by Bond (2002), one-step estimation was favoured over the two-step because the latter was less efficient when the asymptotic t-ratio tended to be too large or the asymptotic standard error tended to be too small. However, Windmeijer (2005) stated that the two-step estimation was better since it produced lower bias and fewer standard errors. Moreover, the two-step estimation corrected the standard error and appeared marginally superior to the one-step estimation's robust standard error.

Blundell and Bond (1998) have proposed three specification tests while verifying the system GMM's estimation results. Firstly, the serial correlation should not have existed in the transformed error terms at the autoregressive order two. Secondly, the Sargan or Hansen test examined over-identifying restrictions during total instruments validation. If the condition holds, then the transformed instrument choices are valid, and the estimation results are appropriately specified. Finally, to validate the extra moment's conditions in the system GMM, the difference in the Hansen test was conducted to measure the results generated from the system GMM and the difference GMM. The three specification tests need to be undertaken to support the model, which will be advocated for failure to reject the null hypotheses.

3.7. Data specification

This paper analyses the determinant factors of stock returns in Malaysia from 2010 to 2019. The annual data for all selected firms listed in Bursa Malaysia are sourced from the Thompson Financial DataStream. There were 853 listed companies covering various economic activities. Following data cleaning, through the removal of financial firms and firms with less than five-year data sets, only 608 remained. All data were

Table 2. The definitions/description of the data points.

Data Points	Definitions/descriptions
Firm-level stock returns ($R_{it} - RF_t$)	The excess returns (firm stock return minus risk-free rate) from the year-end of firm-level stock returns.
BCI_t	The market sentiments variable refers to the MIER's Business Conditions Index (BCI) in Quarter Four for each year.
CSI_t	The market sentiments variable refers to the MIER's Consumer Sentiments Index (CSI) in Quarter Four for each year.
Domestic market returns ($DMR_t - RF_t$)	The excess returns (market return minus risk-free rate) from KLCI . The KLCI consists of the largest 30 companies in Bursa Malaysia's Main Board.
International market returns ($IMR_t - IRF_t$)	The international market excess returns (international market return minus risk-free international rate) from the Standard & Poor 500 Index (SP500). The SP500 tracks the 500 largest companies listed in the United States's stock exchange.
SMB_t	The difference between portfolios' returns of the small stocks and the large stocks.
HML_t	The difference between portfolios' returns of the high and low book-to-market stocks.
$RSALESG_{i,t-1}$	The firm's sales growth in real terms.
$\ln\left(\frac{BV_{i,t-1}}{MV_{i,t-1}}\right)$	The firm's book-to-market value (BVMV).
$\ln\left(\frac{LIQ_{i,t-1}}{TA_{i,t-1}}\right)$	The firm's liquidity ratio is computed as the liquid asset (LIQ) as a percentage of total assets(TA).
$\ln\left(\frac{DEBT_{i,t-1}}{EQUITY_{i,t-1}}\right)$	The ratio of a firm's financial leverage (debt-equity ratio).

Source: Authors.

denominated in the Ringgit Malaysia (MYR) currency. Table 2 summarises the definitions and descriptions of the data used in the study.

4. Results and discussion

This section discusses the results of the augmented model using the dynamic panel GMM estimators comprising 608 firms for the period 2010 to 2019. For the main discussion, the estimation using a two-step procedure with corrected standard error (Windmeijer, 2005) is used to explain the role of explanatory variables on firm-level equity return. The main focus is to analyse the effects of market sentiment indices, namely the BCI and the CSI, on firm-level equity returns using the one-step estimation and two-step estimation. Table 3 reports the correlation matrix between the variables, whereas Table 4 summarises the main findings.

As displayed in Table 3, all explanatory variables have a low correlation, below 0.6. The exceptions are HML and SMB, which are highly positively correlated (0.79). However, both variables (HML and SMB) have been considered in the baseline model (Equation 10) since they are the main factors in the Fama and French (1992, 1996) three-factor model.

Table 4 indicates that using the two-step GMM estimation, the lagged firm stock return, domestic market returns, international market returns, SMB, HML, firm liquidity ratio, and both market sentiment indices (BCI and CSI) exerted significant effects on the firm-level equity return. Since most of the variables were also proven in previous studies as determinants in the Malaysia firm-level stock returns, we can thus state that the augmented Fama and French (1992, 1996) multifactor model is

Table 3. Correlation matrix.

	Dom. Mkt. Returns	SMB	HML	Int. Mkt. Returns	Real Sales	BVMV	Liquidity	Debt-Equity	BCI	CSI
Dom. Mkt. Returns	1									
SMB	0.288	1								
HML	0.2053	0.7856	1							
Int. Mkt. Returns	0.3863	−0.1409	−0.2492	1						
Real Sales	0.0106	−0.0052	0.0034	0.0104	1					
BVMV	0.0393	0.0335	0.0195	0.036	−0.156	1				
Liquidity	−0.0347	−0.0412	−0.0371	−0.0108	−0.013	−0.0462	1			
Debt-Equity	−0.003	0.0026	−0.0102	0.0013	−0.0177	0.2039	−0.2079	1		
BCI	0.1181	−0.2597	−0.2213	0.1371	0.0008	−0.0246	0.0274	−0.0024	1	
CSI	0.1378	−0.152	−0.2227	−0.3147	0.0033	−0.0149	0.0073	0.0099	0.1908	1

Source: Authors.

Table 4. The determinants of firms-level equity return using augmented Fama-French three-factor model: system GMM estimation.

	One-step system GMM			Two-step system GMM		
Explanatory variables	Coef.	Robust std. error	*p*-value	Coef.	Corrected std.error	*p*-value
Lagged dependent variable						
$r_{i,t-1}$	0.2292	0.0818	0.0050***	0.3626	0.1302	0.0050***
$r_{i,t-2}$	0.0072	0.0073	0.3200	0.0102	0.0092	0.2660
Domestic Market Returns	−0.0216	0.0134	0.1080	−0.0179	0.0099	0.0710*
Small Minus Big (SMB)	1.2923	1.0411	0.2140	2.0881	0.8067	0.0100***
High Minus Low (HML)	2.6677	0.3462	0.0000***	2.5505	0.3187	0.0000***
International Market Returns	0.0161	0.0054	0.0030***	0.0204	0.0050	0.0000***
Lagged of real sales growth	0.1161	0.2719	0.6690	−0.1206	0.1837	0.5110
Book-Value-Market Value	0.4223	0.1827	0.0210**	0.2048	0.1428	0.1520
Liquidity	0.1500	0.2329	0.5200	0.3469	0.1874	0.0640*
Financial leverage (debt-equity)	−0.1032	0.0808	0.2010	−0.0311	0.0783	0.6910
Business Conditions Index (BCI) in Q4	3.3261	0.6835	0.0000***	2.8104	0.4495	0.0000***
Consumer Sentiments Index (CSI) in Q4	1.1211	0.4812	0.0200**	1.6432	0.3360	0.0000***
Number of observations		3853			3853	
Observations per group		6.88			6.88	
Number of firms		560			560	
Number of instruments		58			58	
AR (1) - *p*-value		0.029			0.026	
AR (2) - *p*-value		0.234			0.268	
Hansen test - *p*-value		0.109			0.109	
Difference in Hansen test of exogeneity						
GMM instruments for levels						
Hansen test excluding group - *p*-value		0.110			0.110	
Difference (null H = exogenous) - *p*-value		0.322			0.322	
lv (International Market Return)						
Hansen test excluding group - *p*-value		0.117			0.117	
Difference (null H = exogenous) - *p*-value		0.209			0.209	

Notes. *** significant at 1%; ** significant at 5%; * significant at 10%. Constant is not included to save space.
-Instrument for the orthogonal deviation equation is lagged 2 to all available lags for all endogenous variables and all lags for strictly exogenous variables.
-The estimation also collapses the instruments matrix as proposed by Calderon et al. (2002), Roodman (2009), Karim et al. (2011), and Karim and Zaidi (2015).
Source: Authors.

currently the best one to represent the capital market model for an emerging market economy, as proven in the past studies by Karim and Zaidi (2015), and as demonstrated by the Pakistan stock exchange (Abdul et al., 2019).

The results proved that the BCI index has a more significant impact on the firm-level stock returns than the CSI index. Both sentiment indexes (business and consumer) positively and significantly affect firm-level stock returns; however, the magnitude of the impact is different. One per cent increase in the BCI index leads to a 2.81% increase in firms' stock returns, whereas a one per cent increase in the CSI index leads to a 1.64% increase in firms' stock returns. These findings indicate that market sentiment plays a crucial role in influencing the firm-level equity return.

The findings indicate that the business owners' sentiment (in BCI) plays an important role in understanding Malaysia's current stock market conditions and firm-level stock returns than consumers' sentiment (in CSI). It can provide information to market participants to better manage their investment portfolios. The vital role of BCI is expected since the descriptive analysis in Figure 3 shows that the BCI trend is more similar to the trend in the stock market index (KLCI) than that of the CSI. Further, the findings also signify that excellent market sentiment will encourage the bullish sentiment (buying pressure) on the shares and, therefore, will increase the share prices and consequently the firms' stock return. The results also expanded on Fauzias et al. (2013, 2014) and Tuyon et al. (2016), which proposed the BCI and CSI as preferred investor sentiment proxies in the Malaysian stock market.

In addition, the lagged dependent variable (the previous firm-level stock returns) has a positive and statistically significant at the 1% significant level in influencing the firm-level stock return. One percentage (1%) increase in last year's firm-level stock return leads to a rise of 0.36% of current firms' stock returns. Furthermore, the results were not significant for the two-year lagged dependent variable. The relationship between the SMB and HML variables on firm-level stock returns is statistically significant and positive at the 1% significance level. One percentage (1%) increase in the SMB and MHL variables leads to a respective rise of 2.08% and 2.55% firms' stock returns. The liquidity ratio is also positive and statistically significant, in which one percentage (1%) increase in the firm liquidity ratio leads to a rise in stock returns by 0.35%. In comparison, earlier studies, such as Karim and Zaidi (2015), are shown to have ignored the role of market sentiment variables in examining the determinants factors of firm-level stock returns. This study thus established that market sentiment variables should not be overlooked in determining firm-level stock returns when adopting the augmented Fama and French (1992, 1996) multifactor model.

Market returns (domestic and international) have played different roles in the firm-level equity return. The domestic market return is statistically significant and negative at 10%, while the international market return is statistically significant and positive at 1%. For example, a one per cent increase in domestic market return decreases firm-level equity return by 0.01%. In contrast, a one per cent increase in international market returns increases the firm-level stock return by 0.02%. These findings indicate that both market returns play a lesser role in affecting the firm-level stock return in the Malaysian stock market.

The validity of the system GMM depends on three specification tests as mentioned earlier. As shown in Table 4, both one-step and two-step estimations showed that the p-values for the AR (2) and Hansen tests are greater and statistically not significant at the 10% level. The result implies that the empirical model has been correctly specified as indicated by the residuals' absence of serial correlation (autocorrelation). Furthermore, the instruments are also valid. In addition, the Hansen tests' differences are also statistically not significant at the 10% level in all models, indicating the validity of additional moment conditions.

Table 4 also displays the one-step estimation results. Compared to the two-step estimation results, it is apparent that this approach provided more significant variables for the augmented model. Specifically, the two-step estimation method showed

significant values for the domestic market returns and SMB variables, which are not significant under the one-step estimation method. The finding contradicts the standard Fama and French (1992, 1996) three-factor model where these variables, namely domestic market returns and SMB, typically show significant values to firms' stock returns. The findings are consistent with Windmeijer (2005), and it can accordingly be concluded that the two-step system GMM performs better than the one-step GMM with lower biases and standard errors. Bond (2002) earlier stated that a one-step system is preferred over the two-step system GMM if the *t*-ratio is too large or the standard error too small. Since the simulation in this study produced a medium *t*-ratio, and the standard error is neither too small, the study is consistent with the earlier finding.

4.1. Robustness checking[1]

For robustness checking, the estimation model in Equation (9) has been re-estimated using various specifications techniques, such as the difference GMM model, different instrumental assumptions (including different assumptions regarding endogenous and predetermined variables), instruments with level form and difference form equations, and model with a time dummy. In brief, the results are robust, as indicated by MIER's market sentiments (BSI and CSI) are positively and statistically significant in influencing firms' stock returns.

5. Summary and conclusions

The role of the market sentiment (investor sentiment) on stock market behaviour has been given special attention by market traders and financial economists who are interested in understanding their links. Thus, this present study aims to empirically examine how both market sentiments (Business Conditions Index, BCI, and Consumer Sentiments Index, CSI) reflect firm-level equity return using a sample of 608 publicly listed companies over the 2010–2019 period. An augmented Fama and French (1992, 1996) three-factor model and an estimation procedure of dynamic panel GMM technique (short panel) were used to elucidate how the firm-level equity return reacts to both market sentiment (BCI and CSI) and other controlling variables.

New findings from this study revealed that MIER's Sentiment Index (Business Conditions and Consumer Sentiments) positively and significantly influences Malaysia's firm-level stock returns. These findings indicate that positive market sentiment for businesses and consumers will encourage bullish sentiment (buying pressure) for the shares, thus increasing share prices and stock returns. The firm-level stock returns are statistically significantly influenced by its lagged dependent variables, namely domestic market returns (KLCI), international market returns (S&P 500), SMB, HML, and the firm's liquidity ratio. The study also discovered that the two-step system GMM estimator performs better than the one-step system GMM estimator in estimating coefficients with lower biases and standard errors, as Windmeijer (2005) suggested. Therefore, the short panel estimation technique using

two steps GMM can provide an accurate empirical result for further understanding the role of market sentiment and other controlling factors on firm-level equity return.

The new findings are also relevant to potential stakeholders, particularly to policy-makers, market participants and fund managers, in the following ways: First, given that market sentiment plays a crucial role in the stock market, the government, through their macroeconomic policy (fiscal and monetary), needs to ensure that the implementation of macroeconomics policy will foster good or positive sentiment in the market. This is vital since any news relating to government policy will immediately disseminate throughout the market and, consequently, reflect the market sentiment of stock market participants. Second, understanding the role of market sentiment on firm-equity return for market participants and fund managers will help them manage the risk and return on their portfolio investment. Since the role of good (positive) market sentiment dominates other controlling variables, fund managers and market participants need to react accordingly to maximise their potential gains on the stock market. Third, understanding possible factors that may affect the firm-level equity return is also vital in assisting potential future investors in choosing the appropriate shares and the market timing (to buy or sell) to maximise potential capital gain in the future.

Findings from this study explain and elucidate the effects of behavioural biases on firm-level stock returns in the Malaysian stock market. Future research should benefit more if different types of investor sentiment proxies, such as sentiment from market and media indicators (indirect measures), can be proposed to model the firm-level equity return. Additionally, it should be pertinent to analyse whether these sentiments vary across sub-industries and firm sizes. Finally, future studies should also consider the alternative capital market model, such as Arbitrage Pricing Theory (APT), to further understand the main factors affecting firm-level equity return.

Note

1. The full estimations result for robustness checking are not reported in order to save space, and it available upon request.

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