

EVENT STUDY ON STOCK PRICES

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Abstract: The main aims of this paper are to explore the existence of herd behavior and its influence on the stock price of MAS and index of KLSE. The twin disaster within a short period, the disappearing of MAS flight MH370 over the Indian Ocean and the shooting down of MH17 over the Ukraine, had affected Malaysian in general and MAS stock and KLSE index in particular. This paper will explore the existence of herd behavior by using Event Study approach to value the effects of the two events, each event is divided into three time zones; prior, during and after. And the influence of its effects in these time zones is considered. Whether the movement of MAS stocks and KLSE are in tandem is undertaken using EG test of integration.

The findings indicate a significant influence on MAS stocks due to the first disaster but not by the second. Although the stocks and index are affected, there is no evidence of co integration in their movements. The practical implication of the research reflects the need to provide timely, transparent and relevant information for the market to behavior rationally.

Keywords: Herd behavior; Social influence; Malaysian Airline; KLSE.

1. Introduction

Decision making by individuals and institutions is common across diverse fields and often gets influenced by confounders disjoint to the decision variables. Most often, people are likely to make decisions and predictions based on their popularity and impulse rather than on solid reasoning. This behavior of 'what is good for them is also good for me' is common in the stock market and often referred to as herding. Although the expectation that efficient markets is influenced by demand and supply situations and can be predicted reliably, it is often distorted through this herding behavior. This occurrence is found in both up and down markets and is known to take the market to an extreme position and sometimes with vengeance.

The stock markets of the world have faced many such situations that have led them to overreact and cause a loss of market stability and efficiency. The global financial crisis in 2007-2008 and the Asian financial crisis of 1997 are classic examples that proved evidence of herding and its consequences (Moatemri *et al.*, 2013).

No markets have been untouched, both developed and developing markets, by this herd behavior, but its effect and consequences, either muted or amplified, are seen differently by these markets. Hence, it has been a subject of study by many on the reasoning for such behavior, the consequences and reverberation it has on the stock market across the globe.

One latest event that merits investigation into the existence of herd behavior and its influence on the stock market in Malaysia in general and MAS (Malaysian Airlines) stock in particular, is the unfortunate two sequences of events in quick succession that befell Malaysian flag carrier the MAS.

1.1. Research Problem Statement

It is generally accepted that financial markets in general and stock markets in particular exhibit stability and efficiency, hence, an indicator of the state of economic health of nations. However, these goals will be difficult to achieve if external factors, disjointed from reality, play a dominant role. Herding is among one of those external factors which may lead to instability in the stock market.

One possible solution for this is to make sure the stock market can maintain its stability and efficiency by avoiding the influence of those adverse external factors. Research has proven that if the investors can have enough comprehensive knowledge and understanding of the stock market mechanism and if government and related agencies can take immediate action if those factors arise and disseminate information in a timely and transparent manner, it will help to avoid inefficiency as well as instability in the stock markets.

This paper will investigate one specific case, the existence of herd behavior, on MAS stocks listed in Bursa Malaysia due to the two unfortunate crashes of flying assets of Malaysian Airlines that took place recently in quick succession.

Therefore, the aims of this research are to identify:

- o The presence of herding behavior on the listed stock of MAS during that time
- o To gauge the severity of herding behavior on MAS stocks during that time
- o And its implication on MAS stocks and the Bursa Malaysia index as regards to both events

1.2. Research Questions

The following research questions are framed and will be answered based on the aims:

- o Does herding exist in Bursa Malaysia during the period when the first flight MH 370 went missing on 8th March 2014 and when the second flight MH17 was shot down by a missile on July 17?
- o How severely did herding affect MAS stock price when the first incident occurred?
- o How severely did herding affect MAS stock price when the second incident occurred?

- o What are the implications of both events on MAS and Bursa Malaysia?

It is hoped that the outcomes of this finding may help to identify certain mechanisms to limit herding behavior in the Malaysian stock market in order to improve the stability and efficiency of its market.

2. Literature Review

Many events that occurred in stock markets are beyond the common views of fundamentalists and chartists, therefore, merit other approaches and investigations. One such event is market participants imitating each other, in quick succession, creating a wave. Often termed herding in the stock market has been the focus of many studies, (e.g., Banerjee, 1992; Avery and Zemsky, 1998; Chang *et al.*, 2000; Bikchandani & Sharma, 2001; Sias, 2004; Moatemri *et al.*, 2013).

2.1. Herding

Herding reflects market behaviors that begin and end with periods of frenzied buying (bubbles) or selling (crashes) simultaneously without directional forces acting on the same stocks. These irrational and emotionally soaked individual investors, reflecting animal instinct, join the crowd to float with the tide, greed during bubbles and fear during crashes, are often cited as herding (Brunnermeier, 2001). Technical analysts see herding as extreme market sentiment (Prechter, 1999). Behavioral finance has identified herding as the collective irrationality of investors. Investors follow the crowd and jump on the same investment as every other, unidirectional (Shiller, 2000).

2.2. Triggers of Herding

Many rationales have been propagated, the gap between private and public information, time constraint, fear and stock promotion are among those variables.

When private information is not publicly and transparently shared, an individual's behaviour, acting on private information and public reference to such behaviour may select a socially undesirable option (Banerjee, 1992; Bikhchandani, Hirshleifer and Welch, 1992). The second rationale is information aggregation in market contexts, with reference to work by Grossman and Stiglitz (1976). Uninformed traders become informed about the price in such a way that private information is aggregated correctly and efficiently. When traders have private information on only a single dimension of uncertainty, price adjustments prevent herd behaviour. Herding arises when there are two dimensions of uncertainty, but it need not distort prices because the market discounts the informativeness of trades during herding. With a third dimension of uncertainty (the quality of traders' information), herd behaviour can lead to a significant, short-run mispricing (Avery and Zemsky, 1998).

Time constraints and the need to make fast decisions in high volume trading put investors in vulnerable positions (Ordenez, and Benson, 1997). As market activities require split-second decisions, limited time to do research means unusual activity gets noticed by

traders, prompting them to go with the herd in case important news is behind that activity. Hence, following the herd makes them feel more secure, especially during uncertainty and abnormal activity.

Fear too plays a role (Bikhchandani and Sharma, 2001); fear of losing money, fear of missing an opportunity and job if they hold their stock position in spite of large sales volume. In many ways, it is better to have the safety of the herd following in masses, than to take the risk of being the only trader who didn't sell or buy in time. Stock promotion is also a factor, where many companies are relatively unknown to the average investor. Because they tend to be more thinly traded than well-known stocks, any buy volume can move the price of the stock significantly higher. Promoters play on investors' greed and fear of missing the stock that could be the big money-maker of their dreams. The job of stock promoters is to work up enough buy interest in a stock to create herd psychology (Bikhchandani and Sharma, 2001). Wang (2008) draws an analogy between investors and entrepreneurs. The author examined the development of herding towards the market index and made relative comparisons between 21 financial markets, measuring the herding of one market against another or one period against another. He considers how the collective buying or selling of a particular asset at the same time affects the index. He remarked that speculation increases stock prices; success stories attract attention; enthusiasm spreads by word of mouth. If the chain of feedback is not interrupted, it may produce a speculative bubble: high expectations, as opposed to fundamental values, lead to high prices. This makes the bubble easy to burst the moment that people start to change their herd behaviour and think rationally. Moreover, the end of the bubble may not always be triggered by fundamentals but by a sudden external event. The same scenario can be applied to a negative bubble – for example, to self-fulfilling prophecies that could make the current depressed economic situation even worse. This combination of good and bad news contributes to a pattern of fluctuations in herding behaviour (Wang, 2008).

2.3. Forms of Herding

Herding behaviour in the stock market can take place in three different forms. Information-based herding happens when everyone reacts the same way to the announced information. Reputation-based herding is caused by a respected investor or major trading house taking a specific trading stance. Compensation-based herding occurs when certain conditions prompt large institutional money managers to take profits, generally to protect fund earnings before year-end reporting. These behaviours create large volume in certain stocks or sectors that are popular institutional portfolio investments, prompting those watching to react quickly (Bikhchandani and Sharma, 2001).

2.3.1. Spread and Influence

International stock markets exhibit different tendencies to herd behavior. Developed markets like the US and Hong Kong showed no evidence of herding and partial evidence

of herding in Japan. Emerging markets like South Korea and Taiwan showed significant evidence of herding (Wang, 2008). The author inferred that macroeconomic information has a more significant impact on investor behavior in markets which exhibit herding. In all five markets investigated, the rate of increase in security return dispersion as a function of the aggregate market return is higher in the up market, relative to down market days (Wang, 2008). An empirical analysis of the Egyptian stock market by El-Shiaty and Badawi (2014) proved the negative presence of herding behaviour.

Using daily and weekly CSSD, no herding behavior was found in the Indonesian stock market. However, using CSAD, of either data frequency, the result demonstrates the presence of herding behavior, particularly on big capitalizations and liquid stocks. The result differs from Chang, Cheng, and Khorana (2000) who found no different impact of herding behaviour across size-based portfolios. The Ho Chi Minh Stock Exchange (HOSE), indicates evidence of herd mentality in both upward and downward market conditions. However, in recent years, herding occurred only in downward market consensus. This may be due to the fear of potential loss when investors make irrational investment decisions in a falling market (Brunnermeier, 2001).

Herding is stronger in emerging markets than developed ones. Costs and difficulties of collecting timely information in the emerging market are often the reason why it is easier to imitate others' decisions (Wang, 2008). It was also found that herding sentiment travels across international markets due to globalization. The researcher found a higher correlation of herding between markets within the same group across nations with different patterns due to differences like the stage of development of each market or the number of securities listed. Pair wise countries with similar development stage or economic characteristics herding is more positive correlated. Like markets in Australia and France, and markets in India and Indonesia (Wang, 2008). But the long trend is towards less herding and less volatility as investors become more informed and gain more experience thoroughly timely information dissemination due to technology (Wang, 2008).

2.3.2. Market Events

Event studies have been used since the early 1970's to examine a variety of research questions in economics, finance and accounting. Critics of efficiency argue that there are several instances of recent market history, like the market crash of October 1987, pointing to overwhelming evidence that market prices are not rational but psychological. Malkiel (2003) argues that a number of factors could rationally have changed investors' views about the proper value of the stock market in October 1987. A number of pre-events may rationally have increased risk perceptions during October. The cumulative effect of a number of unfavorable "fundamental" events made many investors, simultaneously, to believe they were holding too large a share of their wealth in risky equities." Share prices, he says, can be highly sensitive as a result of rational responses to small changes in interest rates and risk perceptions.

Some aspects of the semi-strong form of Efficiency Hypothesis have been investigated in the Malaysian context through the use of Events Study. Many Malaysian event studies are based on calendar anomaly effects and research findings support some form of reaction. Chia et al (2006) looked into the Calendar anomalies in the Malaysian stock market and found some evidence of Calendar anomalies. Using various generalized autoregressive conditional heteroskedasticity models, their study reveals the different anomaly patterns before, during and after the Asian financial crisis periods. Further, using EGARCH and TGARCH models, they uncovered asymmetrical market reaction to the positive and negative news, rendering doubts on the appropriateness of the previous research that employed GARCH and GARCH-M models in their analysis of calendar anomalies as the latter two models assume asymmetrical market reactions. Choudhry (2001) explains that these calendar anomaly effects are due to seasonal holidays, for example, the Chinese New Year, and not due to imperfection in the markets.

Event studies aim at quantifying the effects of an (unexpected) economic event on the value of firms. Although event study has been successful in the area of corporate finance, there have also been limitations on its applications. Event dates are difficult to identify, event studies will have limitations and have been less useful (Mackinlay, 1997) and the methodology used to compute the cumulative abnormal returns that may induce an upward bias, (MacKinlay, 1997). Nelson (2008), finds event study difficulty to detect and quantify the cost in confounding effects that contaminate the analysis.

2.3.3. Market Events on Airlines Crashes

Event studies of past airline crashes on stock prices are inconclusive. Davidson *et al.* (1987) findings reveal a significant negative reaction to the value of the airlines only in the most severe crashes with the biggest number of fatalities but lasting a few days. Chance and Ferris (1987) inferred negative but insignificant abnormal stock returns. Lin *et al.* (2005) found significant stock price declines both for the carriers and the manufacturers for a very short period and normalizing in the long term, and Kaplanski and Levy (2010) found a reversal occurred within two days after the crash. Costa *et al.* (2013) expanded the studies to companies associated with the accident (manufacturer and airline) and suggested that investors could use the accident as a trading strategy given there were significant abnormal returns in the period after the accident both for the manufacturer and the airline stocks. A comprehensive review of accidents from 1950-2009 in the United States by Ho *et al.* (2013) on the market value of the crash airlines and their rival airlines concluded is almost related to the level of fatality involved in the tragedy.

3. Methodology

Event studies are one of the mainstays of empirical corporate finance research, with two broad goals; testing for a significant information effect on stock return at the time of event

announcement, Patell (1976), Schipper and Thompson (1983) and identifying factors which determine the information effect William et.al. (1990) and Prabhala (1997).

The event study tests what Fama called semi-strong efficiency (Fama, 1970), in which markets react rationally to the release of public information. There are several different analytic techniques commonly used in event studies. These approaches differ in market model specifications and estimation or differ in the calculation of the statistics used for hypothesis testing. A common feature of all the approaches, however, is the basic underlying condition must be satisfied for test statistics to have their assumed distribution.

Some common parametric approaches to event study include, the Dummy Variable approach (Thompson, 1985), Standardized Residual Approach (Patell, 1976) and the Traditional Approach (Brown and Warner, 1980). However, this approach is not without criticism. Many well-documented features of financial return data suggest that the conditions underlying event study hypothesis testing are violated in practice. For example, return data is known to be non-normally distributed, market model parameters have been found to undergo changes around the time of events (Kramer, 1998).

Non-parametric methods were used to occasionally study events, including the use of the rank test (Corrado, 1989) and sign test, and yet others used alternatives to existing parametric and non-parametric methods, like techniques based on bootstrap resampling (Marais, 1984),

According to Thomson, (1995), researchers are left with discretion over the choice of estimation window, projection model, raw versus excess returns, forecast error versus event parameter and the form of hypothesis tests. Credibility is added to the findings of empirical investigations when the methods chosen can be defended on the basis of objective.

The Engle-Granger (EG) bivariate co-integration test is undertaken to detect if any pair-wise co-integration exists, it monitors the impact of an event, say, that occurs in an 'event company' as compared to a 'control company' or other aggregates like indices and its influence on stock returns, price movement and index (Engle & Granger, 1987). The Engle-Granger method is suitable in such situations where a single co-integrating relation needs to be tested for stochastic variables, as is the case with this particular research, the price movement of Malaysian airline stocks with KLCI during the selected period.

Sources of data and Period of Study

The reason for this selection is because the authors want to find out how the investors reacted during the first accident when the first flight of Malaysian airline MH370 went missing on 8th March and the second flight MH17 was shot down by a missile on July 17 of the same year. At the same time, the authors also want to know if there were any significant effects on FTSE Bursa Malaysia KLCI when those two accidents took place.

For the first event, the prior period (PP) is taken as 24 days where the market exhibited stability, during period (PD) is taken as 30 days, a longer period due to the uncertainty of

the reasons for the first event, and the after event (PA) as 30 days where the market exhibited somewhat steady behaviour.

For the second event, the prior period is taken as 15 days where the market exhibited steady movement, during period is taken as 15 days, a shorter period due to the certainty of the reasons given for the event, and the after event as 16 days where the market exhibited somewhat showed steady behaviour.

3.1. Event Study Metrics

The Event Study Metrics is used to measure the valuation effects of two events. The following analysis will be undertaken to study the events. Firstly, the data will be divided into three time zones; prior (PP), during (PD) and after for MAS prices (PA). An analysis of the variance between the three periods will be undertaken to identify any statistically significant differences; significant reaction in financial markets that is hypothesized to affect public firms' market values during the period. An ad hoc test will then proceed, using all combinations of the three periods, to identify significant pairs in the three periods.

The Normal Return Models are used in this study. The time period over which parameters are estimated is commonly denoted as the estimation window. Since the normal return is the expected return in the absence of the event, overlapping event and estimation windows are avoided. Otherwise, normal return model parameters are estimated from returns affected by the event. Event Study Metrics applies the common approach by restricting the estimation window (L_1) to the time period prior to the event window (L_2).

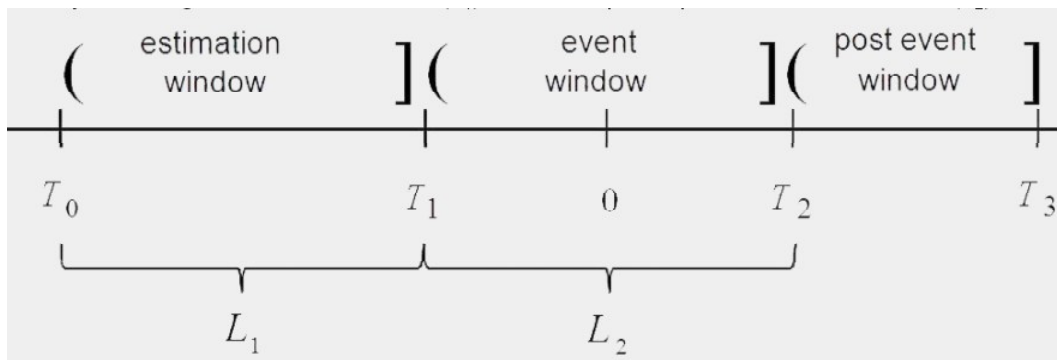


Figure 3.1

Similarly, analysis will be undertaken for KLSE indices; to study any significant influence on the index. Firstly, the data will be divided into three time zones; prior, during and after along the same division given earlier. An analysis of the variance between the three periods will be undertaken to identify any significant differences during the period.

Further tests will then proceed, using all combinations of the three periods, to identify significant pairs in the three periods.

3.2. Co Integration

A test of co-integration of movement between MAS prices and the Index movement was undertaken to identify whether the movements of both were in tandem during the events' period. The Engle Granger test of co-integration is used to analyse the data. This test is used to test the co-integration between the price and index movement. Two variables are said to be co-integrated when a linear combination of the two variables is stationary, implying that there is a relationship existing between them.

Testing for co-integration involves testing the residuals from an Ordinary Least Square regression for the time series and residuals.

$$Y_t = \beta_0 + \beta_1 x_t + \beta_2 z_t + \varepsilon \quad (1)$$

The residuals are obtained from the Ordinary least square and a Dicky-Fuller unit root test is carried out to check for unit root. If a unit root is not present, the residuals are stationary and the variables are co-integrated. The first difference of the residuals ΔY_t is regressed against the first lag of the residual Y_{t-1} and sufficient lags of Y_t

$$\Delta Y_t = (Y_t - Y_{t-1}) = u_t \quad (2)$$

The results of the unit root test, t-statistics, have to be compared with specially calculated critical values. If the estimated $|\tau|$ exceeds any of these critical value, the null hypothesis (no dependency among the variables) can be rejected. Otherwise, the null hypothesis is accepted.

4. Test Results and Analysis

The various analyses are shown below. First, the MAS stock movements of the selected time zones are shown. This is followed by the KLSE index; the movement of the index is captured for the same time zones. Next, the ANOVA test is undertaken on the average prices for the selected time frames for significant differences. Finally, a test of integration is conducted for the selected periods.

4.1. Visual Presentation (from Right to Left)

During the first event, there was a substantial drop in the value of MAS stock but only a slight drop in the KLSE index. However, the second event did not bring about any substantial drop in both the MAS stock and the KLSE index (*Figure 4.1, Note; Time movement from Right to Left*).

4.2. ANOVA Test

An ANOVA was undertaken for the three periods for MAS and KLSE; the following result was obtained and analyzed

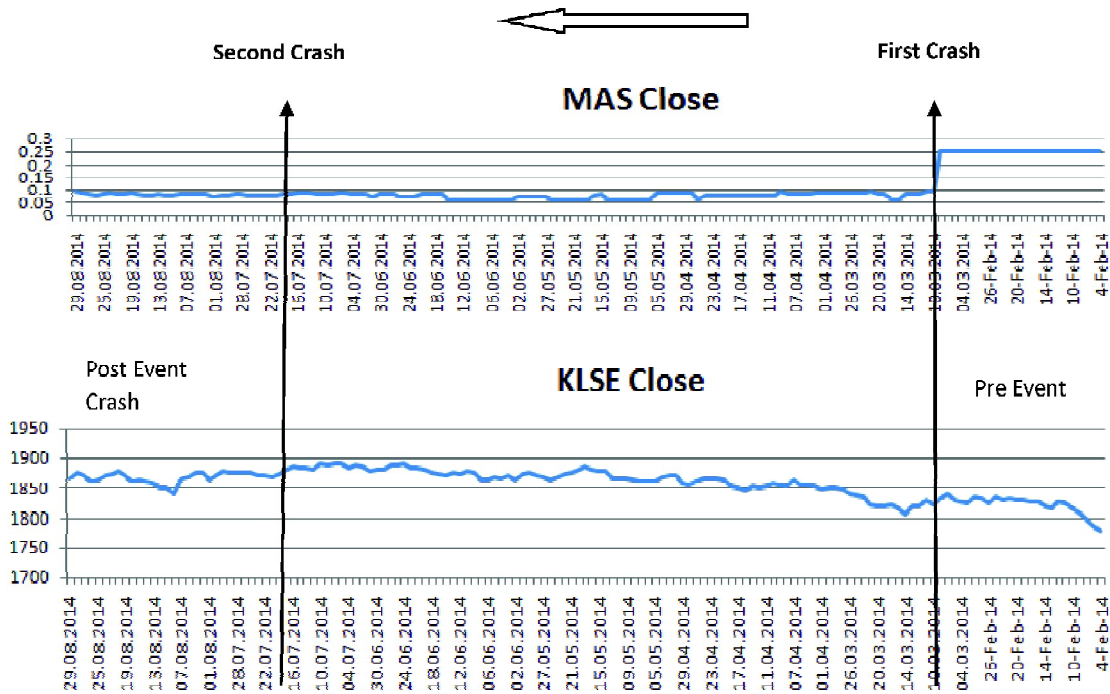


Figure 4.1

Table 4.1

	1st Incident	2nd Incident
	Significance between Prior, During and After Period	Significance between Prior, During and After Period
MAS	s	ns
KLSE	s	s

* ns: Non significant, s* significant

Significant differences exist between Period 1 (prior), Period 2 (during) and Period 3 (after) for MAS.

Significant differences exist between Period 1 (prior), Period 2 (during) and Period 3 (after) for KLSE.

4.3. Ad Hoc Pair-wise test

Ad hoc tests were undertaken for the various pairs of period combinations for MAS and KLSE; the following results were obtained and analyzed.

Table 4.2

	1st Incident			2nd Incident		
	Significance between Prior, During and After Period					
	P1 & P2	P1 & P3	P2 & P3	P1 & P2	P1 & P3	P2 & P3
MAS	s	s	s	ns	ns	ns
KLSE	s	s	s	s	s	s

* ns: Non significant
s: Significant

Significant differences exist between Period 1 (P1) and Period 2 (P2) and for Period 2 and Period 3 (P3) for MAS.

Significant differences exist between Period 1 and Period 2 and for Period 2 and Period 3 for KLSE.

4.4. Engle Granger test

The Engle Granger test of co-integration is used to analyze the data for various periods. This test is used to test the co-integration between the price and index movement. Two variables are said to be co-integrated when a linear combination of the two variables is stationary, implying that there is a relationship existing between them. The results of the unit root test, t-statistics, are compared with specially calculated critical values. If the estimated |t| exceeds the critical values, the null hypothesis (no dependency among the variables) can be rejected.

The hypothesis is set as follow.

Null Hypothesis : There is no linear dependence between MAS and KLSE.

Alternate Hypothesis: There is linear dependence between MAS and KLSE.

The following results was obtained and analyzed;

Table 4.3

Price/IndexMovement	X variable	Standard error	T statistic CR DF
MAS-KLSE	-0.00417	0.00273	-1.54156*

* CRDF is Co integrating regression Dicky-Fuller Statistics.

In the given situation, the estimated EG DF statistic is -1.54. The Engle-Granger 1%, 5% and 10% critical values are -2.5899, -1.9439, and -1.6177. Since the EG DF statistic is found to be less than the critical value specified by Engle and Granger, the Null Hypothesis is that there is no dependence between the MAS and KLSE during the crisis period.

5. Summary of Findings and Discussion

5.1. Summary of Findings

The concept of herding has been widely researched for many types of events and scenarios. Here, we analyze the existence of herd behavior on MAS stocks in particular and the KLSE index in general due to two incidents related to Malaysian Airlines.

Events study is used to study the herd behavior for both events and Engel Granger (EG) theory of co-integration is used to study the co-integration between MAS and KLSE during the event periods.

The findings indicate herding behavior during the first event but not the second event for MAS stocks. There is no indication of co-integration during and after the events periods between the KLSE index and MAS stocks.

5.2. Discussion

While performing the test result, it is hoped to find under which circumstances people are influenced by herd behaviour, regardless of whether it is rational or not. In the case of the Malaysian airline's double tragedy, during the first event, there was a substantial drop in the value of MAS stock, despite the fact that the event was irrational, people were merely influenced by herds. Shares of Malaysia Airlines closed nearly 10% lower on Friday and had remained at a low value. Past studies indicated the herding lasted at most a day or two (Kaplanski and Levy, 2010; Lin *et al.*, 2005). But in this case, it has lasted throughout (and into the second crash) with a (likely) substantial loss of life and the uncertainty about the location of the plane affected market value (Ho *et al.*, 2013). The firm had lost more than 40% of its market value, which could have influenced the repurchase decision when such low prices could be seen as an opportunity for trading strategy (Costa *et al.*, 2013). Further, only 30% of the company's shares are able to be bought freely on the stock exchange in Kuala Lumpur, with the rest held by state investment firm Khazanah Nasional. Of the 30% that trades on Malaysia's stock exchange, most of that is owned by the country's pension funds and other institutions, leaving a small proportion for retail investors to trade. This could explain the limited drop in retail buyers' herd behaviour in the first crash.

And further, explains why no herd behaviour was found during the second event that occurred in quick succession. Although shares of MAS, the most heavily traded stock on that day, had intraday losses, they recovered somewhat at the end of the day, minimising losses with state-owned institutional involvement.

Overall, the result of this study shows that there was herding during the first incident but not the second. The proportion of influence on the second incident was mitigated by government ownership and government-linked agencies and fewer retailer investors holding stocks.

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