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Speculative Bubble Periods of Malaysian Stock Market-1997

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Rational speculative bubble can be defined as transient upward movements of prices above intrinsic value. This study focused on rational speculative bubble period of Malaysian stock market during year 1997. The intrinsic value predicted by using the selected time interval is 1154.71 which shows that the market value is deviated about 10.12% from its fundamental value. This deviation is called as size of the speculative rational bubble that formed during financial crisis 1997. By using the predicted intrinsic value, we found that the rational speculative bubble start to form and grow in Malaysian stock market from 25/03/1996 to 28/03/1997. There are seven bubble phases found in the period of selected time interval. It is essential needs for researcher to study on financial bubbles. It is because the economic bubbles are one of the serious issue that give negative implications to the development of economy which is the factor leads to an economy crisis.

Keywords: Economic bubbles, Forecasting, Intrinsic value, GJLS, Stock Market, Malaysia

INTRODUCTION

Rational speculative bubble is one of the most serious issue that affected many countries economy during the year 1997. Malaysia is one of the Asian country that affected by rational speculative bubble. This bubble can be explained as positive acceleration of prices above its intrinsic value (Galbraith, 1929; D.Sornette, 2003; C.Kindleberger, 2000; R.J Shiller, 2005). Many theories describes that economic bubbles can be formed due to positive feedback trading by noise traders, heterogeneous beliefs of investors together with a limitation on arbitrage and synchronization failures among rational traders.

Researches done by (J.Linter, 1969; E.Miller, 1977; M.Harrison & D.Kreps, 1978; J.Chen et al., 2002; J.Scheinkman & W.Xiong, 2003; D.Duffie et al., 2002) proved that the combined effects of heterogeneous beliefs and short-sales constrained may cause large movements in asset. In this kind of models which assume heterogeneous beliefs and short-sales, the asset prices are determined at equilibrium to the extent that they reflect the heterogeneous beliefs about payoffs, but short sales boundaries force the pessimistic investors disappear from the market, leaving only optimistic investors and thus magnified asset price levels. However, when short sales limitations no longer tie investors, then prices fall back downwards. In another class of models, the role of "noise traders" in fostering positive feedback trading has been emphasized. The term "noise trader" was proposed first by Kyle & S. Albert,

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(1985) and F. Black (1985) to portray irrational investors. These noise positive feedback traders purchase securities when prices rises and sell when prices drop. Due to this positive feedback mechanism, the divergence between the market price and the intrinsic value has been bloated (Shleifer et al., 1990; N.Barberis et al., 1998; K.Daniel et al., 1998; H.Hong et al., 2005). The empirical evidences on this theory are mainly from the studies on momentum trading strategies. Stocks which performed poorly in the past will perform better in a long-term perspective (over the next three to five years) than stocks which performed well in the past (De Bondt et al., 1985). In contrast, at intermediate horizon (three to twelve months), the stocks which performed well previously will still perform better (N.Jagadeesh & S.Titman, 2001). However, identifying the existence of economic bubbles remains an unsolved problem in standard econometric and financial economic methods. This is due to the fact that the intrinsic value is in general poorly constrained and it is impossible to differentiate between exponentially growing bubble prices. Diagnosing the bubble ex-ante could help to take several actions to stop from bubble bursting. But none of the theories mentioned above can diagnose bubble ex-ante. This may be due to the fact that all these theories cannot distinguish between intrinsic and bubble price and cannot give a price dynamics which leads to a crash.

Generalized Johansen-Ledoit-Sornette (GJLS) Models have been developed as flexible tools to detect bubble size by predicting fundamental value by (W. Yan, 2011). This study focused on estimating bubble size that formed in KLCI stock market and its bubble period during year 1997.

GENERALISED JOHANSEN LEODIT SORNETTE MODEL

The price dynamics of an asset as

$$dp = \mu(t)pdt + \sigma(t)pdW - \kappa(p - p_1)^{\gamma} dj \quad (1)$$

where the $\mu(t)pdt + \sigma(t)pdW$ explains the statistical geometrical Brownian motion and the third term is the jump. When the crash occurs at some time t^* (indicate $\int_{t^{*-}}^{t^{*+}} dj = 1$), the price drops abruptly by amplitude $\kappa\left(p\left(t^*\right) - p_1\right)^{\gamma}$.

where $\kappa = \gamma = 1$, the price drops from $p(t^{*-})$ to $p\left(t^{*+}\right) = p_1$. The price changes from its value just before crash to a fixed well-defined valuation p_1.

Inferring no-arbitrage condition $E_t[dp] = 0$ to (1) leads to

$$\mu(t)p = k(p - p_1)^{\gamma} h(t) \quad (2)$$

Conditional on the absence of a crash, the dynamics of the expected price obeys the equation

$$dp = \mu(t)pdt = k(p - p_1)^{\gamma} h(t)dt \quad (3)$$

and the fundamental price must obey the condition $p_1 < \min p(t)$. For $\gamma = 1$, the solution is

$$\ln\left[p(t) - p_1\right] = A + B(t_c - t)^m + C(t_c - t)^m \cos(\omega \ln(t_c - t) + \phi) \quad (4)$$

For $\gamma \in (1,0)$, the solution is

$$(p - p_1)^{1-\gamma} = A + B(t_c - t)^m + C(t_c - t)^m \cos(\omega \ln(t_c - t) + \phi) \quad (5)$$

do not consider the case $\gamma > 1$ which would give an economically non-sensible behaviour, namely the price diverges in finite time before the crash hazard rate itself diverges.

In summary, W. Yan (2011) considered a model as shown below.

$$p_1 + \exp(A + B(t_c - t)^m + C(t_c - t)^m \cos(\omega \ln(t_c - t) + \phi)), \gamma = 1 \quad (6)$$

The final model (6) was applied to the KLCI to identify the size of bubble that appeared during the year 1997 and its bubble period by estimating fundamental value.

RESULTS

TABLE 1 HERE

The obtained intrinsic value and bubble size are shown in table 1. The estimated intrinsic value explains that the market value deviated about 10.12% or 116.86 from its fundamental value. This deviation between fundamental value and market value is defined as bubble size that appeared in KLCI stock market. The following table 2 shows the bubble period in KLCI during the 1997. The maximum size of rational speculative bubble formed in Malaysian stock market is 10.12% and appeared about 165 days before crash. According to the Table 2, we can summarize that the longer the duration the bigger the size of the bubble formed.

TABLE 2 HERE

DIAGRAM 1 HERE

CONCLUSION

In a conclusion, this paper examines the intrinsic value and size of rational speculative bubble and its period in Malaysian stock market during the year 1997. The GJLS model was successfully employed to the data to achieve our goal of study.

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APPENDIX

Table 1: Intrinsic value and size of the rational speculative bubble of KLCI during the year 1997

Time Interval	Market Value	Estimated Intrinsic Value	Size of Rational Speculative Bubble
01/01/1995- 28/03/1997	1271.57	1154.71	116.86,10.12%

Table 2: Bubble Phases of Malaysian Stock Market during the year 1997

Bubble Phases					Bubble Size	
Starts		Ends		Duration(days)		
Date	Market Value	Date	Market Value		Min %	Max %
25/03/1996	1160.49	25/03/1996	1160.49	1	0.50	0.50
01/04/1996	1158.44	01/04/1996	1158.44	1	0.32	0.32
03/04/1996	1156.09	03/04/1996	1156.09	1	0.10	0.10
15/04/1996	1160.48	07/05/1996	1161.94	23	0.48	3.02
09/05/1996	1162.14	14/05/1996	1163.99	6	0.62	0.78
17/05/1996	1155.55	17/05/1996	1155.55	1	0.05	0.05
15/10/1996	1156.40	28/03/1997	1217.64	165	0.12	10.12

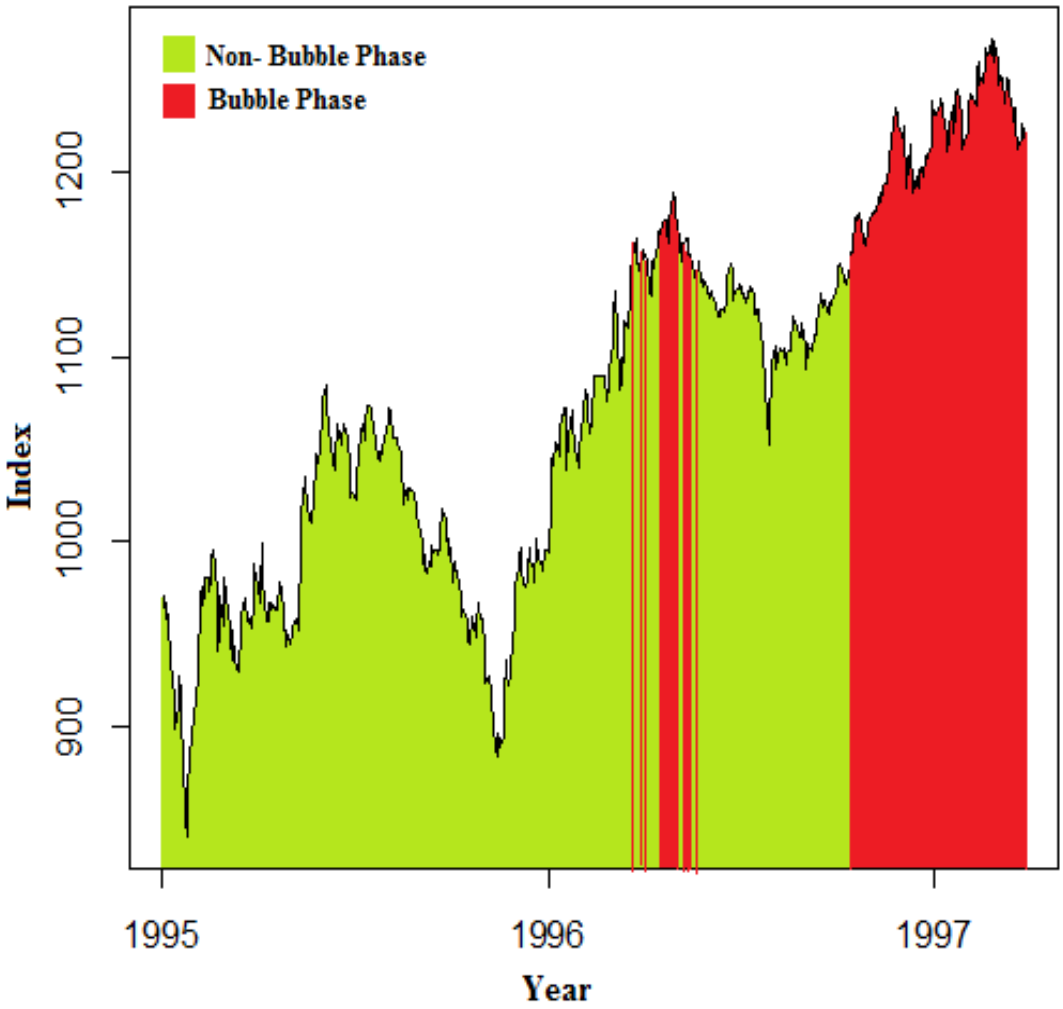

Diagram 1: Bubble phases of Malaysian stock market during the year 1997