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Rational Speculative Bubbles in Vietnamese Stock Market

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ABSTRACT

The Vietnamese stock market like other emerging markets,faces problems of volatility and inefficiency. During 2006-2008, prices dramatically (the benchmark increased from 500 at beginning of 2006 to over 1,100 in mid of March 2007) then fell quickly (the benchmark was around 300 at the end of 2008). Many arguments explain fluctuations of stock prices through either imbalance between demand-supply of securities in the market, or ineffective monetary policy…The study sought to detect the presence of rational speculative bubbles in the stock markets. We conclude that there were rational speculative bubbles in the Vietnamese stock market, which were partially responsible for pushing up the stock prices.

1. Introduction

One of the major functions of a stock market is the allocation of capital resources for the whole economy. Stock markets represent an indicator of the growth of the economy, the allocation of capital resources plays a critical role in the determination of the rate of growth of that economy's output (Baumol (1965)), the stock market is also a channel for the flow of liquidity of a company's shareholders and assists the companies to get more capital from the economy to extend their business; if the stock market serves its function correctly to supply available capital, the development of companies will support the growing economy; if not, the whole economy will suffer.

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The stock market also serves as an indicator for the level of transparency of companies. The regulation for listed companies ensures that both the stock market and the public are clearly informed of its business activities and its asset and wealth. These regulations are for the protection of the investing public to make sure that investors make suitable decisions for their investments as well as their expected dividend. Ideally, the stock price will measure the value of the company whose ownership it represents.

In traditional definition, a bubble is an anomaly whereby "trade in high volumes that are considerably at variance with intrinsic value". There have existed major bubbles around the world - in the past 400years. According to Abreu and Brunnermeier (2003), these bubbles includes the Dutch Tulip mania of 1630's in Netherlands, the South Sea bubble of 1719-1720 in England and the Internet bubble in the early 2000; and Edison, Luangaram et al. (1998) illustrated the financial crash in East Asian by employed

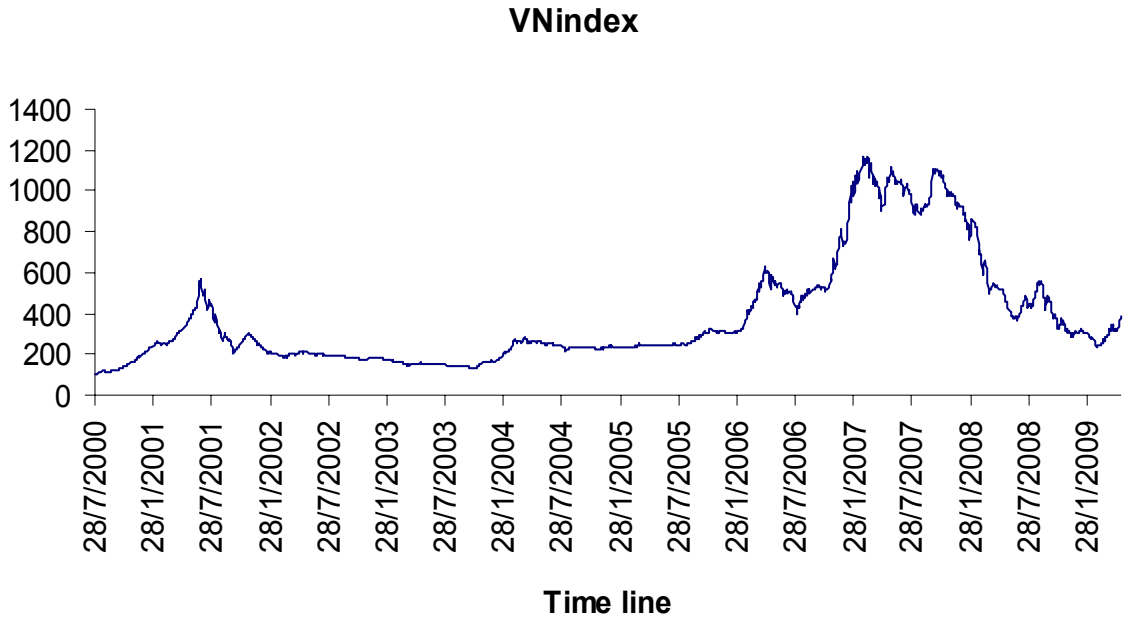
the model of Kiyotaki and Moore (1997) for Thailand, Korea and Indonesia was a result of asset bubble in financial crisis in 1997 which was started from Thailand. Some scholars such as Hardouvelis (1988), Dwyer and Hafer (1989) tried to detect the existence of bubbles in stock markets of England, United Stated, Japan in the middle of 1980's or Brooks and Katsaris (2003) found that the bubbles existed in London Stock Exchange from 1993 to the end of 1990's. The evidence of bubbles has not only been detected in stock markets, but has also appeared in other markets e.g., for foreign exchange market or real estate. The bubbles exist due to speculative behavior on the part of investors, making the market prices in excess of their fundamental values to gain as much profit as possible.

According to the international evidence of bubbles in financial markets, if the bubbles exist, they will surely burst in the future. This result illustrates that the market is inefficient. A collapse of the market is not only serious for the market itself but also the whole economy will suffer a slowdown of the economic growth and a misallocation of resources. Although bubbles create more liquidity for assets, they also unbalance demand and supply in short term, the market then heads up, then the real demand and prices in the market are increased, investors feel that they are wealthier and could consume more. But if a burst follows, the consumers' confidence drops as they lose funds, opening a danger the market will collapse if prices fall more deeply. This was evidenced in the bubbles and bursts in the stock market from 1929 in the United States and the boom of Japanese economy in 1987. Both bubbles were followed by a deep recession which made the whole economy weak. A more recent example is the expansion of the 1997 financial crisis in Asia to many countries, serious reducing the sustainable development in the region.

From 1986, Vietnam began changing its economic policies, because of problems in its centrally planned economy, but the pace of reformation was speeded up following the collapse of the former Soviet Union in 1989. It required the Vietnamese government to be come both more independent and more efficient in its policies: one of those policies was to privatize the state-owned enterprises, which had received soft financial support from the government under annually production, prices and distribution. Although privatization was initiated in 1992, the stock exchange was nor established until 9 years later with two only listed shares.

During the past three years, the Vietnamese stock market experienced a sharp boom and then quickly declined. Investors in the market were scared of a burst of the stock price bubble, with serious and disastrous effects to the financial crisis of 1997. Whether the bubble exists in the Vietnam stock market today is the biggest concern for both investors and policy makers. Within the eight years since its establishment, the two firms have grown to 157 listed companies in Hochiminh stock exchange (HOSE) by December 2008. Except for bonds and investment certificates (four investment certificates), the VN-Index has experienced amazing fluctuations from 2006 to the present (figure 1). It reached a peak in March 2007 at over 1,100 points, only to fall around 250-300 points at beginning of 2009- it was assessed as a fever and investors felt they could get higher profit in other areas of investments; Reasons give to explain the fluctuations of stock prices include imbalance between supply and demand, low lending interest rates, and a high FDI during 2006-2007.

Figure 1: Vnindex from 2000 to 2009



Source: www.hsx.vn

During the period 2006-2007, almost all listed items increased by at least 100%, giving the impression that the stock market was an opportunity to get high returns in a short time. The dramatic change of stock prices in two years was of most concern for investors and authorities- also for the financial institutes about the real value of each listed share in the market. Subsequent examination revealed all listed items had a dramatic increase in comparison to their first listed day, and that there was always was an unbalance in trading between buying and selling offers in the stock. It seemed that investors did not want to know the real valuation of the share and its business strategies; merely holding and selling after several days gave a high return. Schainkman et al (2003) state that behavior of participants in the stock market was "overconfidence" and they knew there was a bubble, but wanted to take full advantage before it burst- These characteristics are typical of a "speculative bubble".

Given these above facts regarding the Vietnamese stock market, the present study analyzes whether the bubbles existed or were simply a fundamental market movement that just happened to push the stock prices up quickly, leading investors to pour money into a new stock market without the required knowledge.

2. Literature review

The bubble of an asset price exists in a financial market due to arbitrage or overlapping generations economies. This phenomenon happens when there is an excess of fundamental value over market price of a given asset. Blanchard and Watson (1982) explain that the high expectations for the asset price are a partial consequence of the bubble, the bubble are not only expectation, but from other sources which have been explained in different theories:

On the one hand, some economists believe that the bubble exists when the asset price is exceeded the fundamental value of asset. Flood and Garber (1980)

argue that "the bubble can arise when the actual market price depends positively on its own expected rate of change, hence in arbitrary, the self-fulfilling expectation of price changes may drive actual price independently of market fundamentals"; Allen and Gale (2000) found that the agency relationship in the banking sector could lead to a bubble through the shifting of risk of their borrowing from financial institutes. Banks sometimes relax their policy for borrowers who could invest in a risky asset and try to push up the price to avoid loss from interest rates on borrowing. Tirole (1985) deployed the dynamic model to examine the existence of bubble, he found that there is no existence of bubble equilibrium for any return on the stocks that is larger than the rate of growing economy, and if that return is less, a steady-state bubble may be positive. He summarized three necessary conditions to create the bubble: durability, scarcity and common belief.

On the other hand, Harrison and Kreps (1978) concluded that under finite maturity bubbles do not exist, as investors have only a finite number of trading and wealth, hence the equilibrium price exactly coincides with the asset's fundamental value. But the growth of bubbles happens in cases of infinite maturity, because investors have more trading opportunities, there are new equilibrium allocations, the fundamental value of asset change overtime due to a new underwriting from investors; or bubbles grow over time due to changing expectation (Diba (1988)).

With a diversified definition of bubbles, there are some arguments for fundamental value, but most of them are based upon the dividend of that security, Baumol (1965) said that while the stock price could be the value of future earning, and the past earning are a reference to predict the future return; past earnings also reflect the public's expectation about this earning.

Several empirical articles have tested the existence of stock market bubbles around the world since the crash in 1929 in United States or that of 1987. Each of these articles employed different framework to estimate the appearance of bubbles in stock market. In general, they maybe divided into three operating frameworks to detect the bubbles:

The first methodology to test bubble premium was introduced by Rappoport and White (1991), who attemted to prove that the bubble existed by using the broker's loan rate model for asset pricing instead of dividends which could not have any evidence of existence of a bubble. Hardouvelis (1988) implemented their test based on finding positive of bubble premium (the extra return rate investors expect to receive over their required rate of return) and the result showed that there was an excess between actual receive (discount factor) and the sum of risk premium with bubble premium in Japan and the United States. He conclued that bubbles existed in those two countries, in contrast to Great Britain, where evidence of the presence of bubble is weak.

The second method used to detect directly the existence of bubbles in the stock market prices is the excess volatility test- including variance bounds test. This the test compares the variance of actual and fundamental values, employed by Shiller (1981), while Shiller proved that there is an excess in actual price volatility, Marsh and Merton (1986) failed to detect existence of bubbles because of the nonstationary of dividend and stock prices.

The third technique that may be employed to find the relationship between observed stock market prices with their fundamental values is the cointegration test. Fama and French (1988) and other researchers have employed this approach to test the cointegration between the dividend process and stock market prices. If dividends and stock prices are

cointegrated, there is no existing bubble in the stock market.

Unfortunately, each of the above frameworks and methodologies contains some problems such as misspecified components for the tests, and may therefore lead to different conclusions in the same markets. Especially, the dividend process which plays an important role in the test, is not predicted in the same way by each technique, therefore the different conclusions are unavoidable. McQueen and Thorley (1994) constructed a new technique to detect the bubble in a stock market which seeks to overcome the misspecification in the types of tests listed above. Interestingly, the new test is suitable for discrete or monthly data; nor does it concentrate on the fundamental values as well as the dividend process as in traditional tests. The Mc Queen-Thorley test was employed by Chan, McQueen et al. (1998) to test speculative bubbles in six Asian stock markets (HongKong, Japan, Korean Malaysia, Thailand and Taiwan) and the US stock market. Subsequently, Watanapalachaikul and Islam (2003) used the technique to test for speculative bubbles, and Jirasakuldech et al. (2007) for rational bubbles in the Thai stock market, meanwhile Mokhtar et al. (2006) detected rational bubbles successful in Malaysian stock market; and Haque et al. (2008) established the existence of bubbles in Chinese stock market with the same technique.

3. Methodology

For the McQueen-Thorley test, the data consist of a set S_T- with T observations of random length, *I*. The definition of a run is a sequence of abnormal returns in the same signs (if positive in period t, it will be positive in period t+1). So, *I* is defined as a positive valuation of discrete random variable which is generated by some discrete function; and the corresponding cumulative density function as $f_i \equiv \Pr ob(I = i)$ and $F_i \equiv \Pr ob(I < i)$, respectively.

Hence, the hazard function which is related to the density function is:

$$h_i = \frac{f_i}{(1-F_i)} \text{ and } f_i = h_i \prod_{j=1}^{i-1}(1-h_j)$$

Let N_i and P_i represent the count of completed and partial runs, respectively, of lengths *i* in the series. The density function of the log likelihood is defined as follows:

$$L(\theta|S_T) = \sum_{i=1}^{\infty} N_i \ln h_i + M_i \ln(1-h_i) + Q_i(1-h_i) \quad (1)$$

where θ: a vector of parameters. M_i and Q_i: the count of completed and partial runs with a length greater than *i*, respectively.

A partial run could occur at the beginning and at the end of the examined time period. The hazard function- $h_i \equiv prob(I = i | I \geq i)$ expresses the probability that a run will end at *i*. The hazard function specifies show the data series in term of conditional of probabilities, which are opposite to the density function specification of unconditional probabilities. The choice of hazard or density specifications is based on the economic question of interest. McQueen and Thorley (1994) showed that the probability of a negative observation of innovation with the condition of a sequence of *i* prior positive innovations:

$$h_i = prob(\varepsilon_t < 0 | \varepsilon_{t-1} > 0, \varepsilon_{t-2} > 0, ..., \varepsilon_{t-i} > 0, \varepsilon_{t-i-1} < 0)$$

decreases in *i.* They further proved that $h_{i+1} < h_i$ for all *i* if the bubble present. Since the bubble is not negative, a similar inequality does not hold for runs of negative abnormal returns. Their conclusion is "*bubbles generate duration dependence in runs of positive, but not negative, abnormal returns".*

The terms P_i and Q_i in equation (1) incorporate information contained in partial runs and could be skipped in large samples. All real returns are converted into lengths of positive and negative returns. The numbers of positive or negative runs of particular length *i* are then counted. The sample hazard rate for each length *i* is computed as

$$\hat{h}_i = \frac{N_i}{M_i + N_i} \quad (2)$$

which is derived from maximizing the hazard function log likelihood of the equation (1).

To detect rational bubbles, a log logistic functional form is used (this method was applied by McQueen and Thorley (1994); and Chan, McQueen et al. (1998)):

$$h_i = \frac{1}{1 + e^{-(\alpha + \beta \ln i)}} \quad (3)$$

The log logistic function transforms the unbounded range ($\alpha + \beta \ln i$) into the bounded (0,1) space of h_i; i.e. the conditional probabilities of ending a run.

The null hypothesis of no bubbles illustrates that the probabilities of a run ending are dependent of prior returns i.e. that positive and negative abnormal return are random. Numerically for the null hypothesis, it must be shown that $\beta = 0$, implying a constant hazard rate. The bubble alternative says that the probabilities of a positive run ending should decline with the run length; or the β is negative (decreasing hazard rates). Equation (1) will be maximized after substituting equation (3) and using the likelihood ratio test of β.

Under the null hypothesis of no bubble ($\beta = 0$), the likelihood ratio test is asymptotically distributed chi-square with one degree of freedom.

4. Empirical result

A. Data

The tests were applied to monthly data on the Hochiminh Stock Exchange (HOSE) index, namely VNindex, from 2003:1 to 2009:4 as coolected from the HOSE website. The monthly index at the end of a month is a proxy of closing prices P_t. The duration dependence employs the real stock returns, which are calculated from stock returns the inflation rate. Real stock returns are then divided into 2 sets: positive and negative runs.

Stock returns are defined as: $R_t = \frac{100 * (P_t - P_{t-1})}{P_{t-1}}$, where P_t is the series of price indices for period t, and P_{t-1} is the price indices of the previous month. To set up the real returns, the stock returns deflated by the compound CPI (Consumer Price Index).

B. Duration dependence test

After the negative and positive runs are separated into two sets, the tests are performed by using a logit formulation. The independent variable is the log of the current length of the run and the dependent variable is 1 (or 0) if the run ends (or does not end) in the next period. The likelihood ratio test (LRT) of β=0 is an asymptotically distributed χ^2 with one degree of freedom. The sample hazard rates are calculated by equation (2)

$$\hat{h}_i = \frac{N_i}{M_i + N_i}$$

which represents the conditional probability that a run ands at *i*, given that it lasts until *i*. A run of length *i* is a sequence of *i* excess returns of the same sign.

Table 1: Run counts, hazard rates and tests of duration dependence for runs of monthly excess returns

Run length	Positive		Negative	
	Actual run counts Total= 36	Sample hazard rates	Actual run counts Total= 39	Sample hazard rates
1	8	0.470	5	0.294
2	4	0.444	7	0.583
3	1	0.200	2	0.400
4	3	0.750	1	0.333
5	1	1.000	2	1.000
Log-logistic test				
α		2.42		1.87
β		-2.64		-2.23
LRT of H_0: β=0		14.12		9.88
(p-value)		(0.0002)		(0.0017)

The null hypothesis of no bubble implies that the hazard rate is constant (or the slope β=0). The alternative hypothesis requires a negative sloping hazard function (β<0) for the runs of positive returns. As the result in table 1 demonstrate, the VNindex has a significant negative β coefficient of -2.64; the likelihood ratio test (LRT) of the null hypothesis of no duration dependence or constant hazard rate (H0: β=0) is rejected at the 1% significant level with the LRT=14.12. The evidence on existence of bubbles in the VNindex indicates that the fever during period of 2003 to 2009 was partially led by rational expectations.

For the result from negative returns, the null hypothesis (H0: β=0) is rejected at the 1% significant level with the LRT= 9.88 and slope β=-2.23. Since rational bubbles cannot be negative, the significant result in the runs of negative returns implies the VNindex must be driven by chance or some other deviations from serially independent returns such as fads, but not by rational bubbles. It is possible that although investors were aware of the existence of stock prices bubbles, they did not want to stop their trading or withdraw funds from stock market because they could be compensated from the soaring stock prices which could be higher than their loses if the bubble burst. Besides the common belief in increasing period to period stock prices, another reason that could directly affect the stock prices was the fooling trade that affected some investors. The foreign investors' trading was led domestic investors as followers, or some key staff would like to increase

their shares in their company making a trend of buying that share. Such fooling behavior was conjectured to be the main reason for sudden change in stock prices (in both situations of increase and decline).

5. Conclusion

This study sought to apply the duration dependence test, the most suitable for the Vietnamese Stock Exchange because of lack of data. This test could explain the partial soaring stock prices during 2006-2008, which showed that there were rational bubbles in the stock exchange. This evidence could serve as a reference for further academic research in the stock market and help investors when making their trading decisions, since there was no official prior evidence to prove that the Vietnamese stock market contained bubbles.

The Vietnamese stock market is an emerging market, where imperfection and speculation are unavoidable. But, if it is found that bubbles exist, the government should formulate a suitable policy to dampen down the fever if the bubbles seem to be getting out of control and help maintain investor confidence in the Vietnamese economy. It is most important that the government make the stock market more transparent and enact strict regulations to control illegal trading, ”inside trading” or the echoes of speculators who spread rumors for their own financial gain.

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