

A Comparative Analysis of Vietnamese and Chinese Stock Market Using Hurst Exponent Analysis

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Abstract— Vietnamese economy has developed tremendously since the early 1990s, keeping its GDP growth rate above 7% for a long time. After a few years' slow down due to the Asian Crisis, it re-developed after 2002. Unfortunately, since the Subprime Loan Crisis broke out in 2007, its economy development became slow and had shown no sign of recovery. Before the global crisis, HoChiMinh Stock Exchanges was established in 2000 and five years later, in the capital of Vietnam – Hanoi, the Hanoi Stock Exchanges was opened. These two markets did not evolve as quickly as expected. On the contrary, it is still underdeveloped even though it has existed for more than ten years. This paper discusses and analyses the overview and present status of Vietnamese Stock Market. By comparing it with the Chinese Stock Market, the similarities and differences between the two markets are determined. Then, the reasons of underdevelopment of Vietnamese Stock Market are examined.

Keywords t—*Vietnamese Stock Market; Chinese Stock Market; Market Performance; Hurst Exponent Analysis; Market Efficiency*

I. INTRODUCTION

Vietnam has attracted more and more attention from all over the world thanks to its high economic development in the past decades. Its neighbor country, China, which has already reached the top of the world economy, once adopted the similar economic reform policies at the beginning of the 1980s. Both countries launched economic reforms from the late of the 1980s and became examples of high economic and technology development, but they experienced different economic innovation processes in different time periods and to different degrees. Because of the high rate of economic expansion, the capital markets in both countries need to be developed. Meanwhile, the analyses of the capital markets become important since the movement and the performance of the markets can influence their domestic economies and the global economy as well. So far, an increasing number of studies on Chinese stock market have been done. Comparatively, less research on Vietnamese stock market has been conducted. Recently, more attention has been focused on studying the emerging capital markets including Vietnamese stock market. This paper focuses on a comparative analysis of the Vietnamese and Chinese stock market to determine whether the Vietnamese Stock Market is efficient or not.

The rest of this paper is organized as follows. Section II gives an overview of Vietnamese Stock Market and Chinese

Stock Markets. Section III presents the indices of the Vietnamese Stock Market and Chinese Stock Market. In Section IV, the similarities and differences of the performance of these two markets are examined. Hurst Exponent Analysis and the results are included in Section V, and finally, the conclusion is given in Section VI.

II. BACKGROUND OF ESTABLISHMENT OF THE TWO MARKETS

A. Vietnamese Stock Market

Vietnamese history includes almost 30 years of wars, and its economy was destroyed by these wars. After the wars had ended, Vietnam followed the Soviet Union's economic model and established a socialist economic system. This economic system was very inefficient. Some problems such as the lack of domestic productivity, an undeveloped goods market, heavy overseas debts and insufficient development of infrastructure became serious and resulted in a long-term stagnant economy. Vietnam became one of the poorest countries in the world. It urgently needed to change the economic system to remove of the poverty. In 1986, the 6th National Congress of the Communist Party of Vietnam was held. There a decision was made to direct the economy toward market principles called "Doi Moi", aiming to renew the politics and economy, in which the main task was to shift from a planned economy to a socialism-orientated market economy. The establishment of a Vietnamese Stock Market was proposed at the 10th general meeting of Vietnam Communist Party Committee, in November of 1990. Besides the 6th national congress, the 7th and 8th national congresses played important roles in pushing the implementation of the reform policies. The "Doi Moi" was re-discussed and finally confirmed at the 7th National Congress of the Communist Party of Vietnam held on June 24, 1991, and five years later it was strongly supported at the 8th national congress and finally substantially carried out.

To implement and further the economic reform, the privatization of government enterprises was promoted, accompanied by the issuance of many stocks by the companies, but not through financial institutions. Those stocks were actively circulated among the individual investors beyond their companies. Due to the increasing demand for selling the stocks or investing in different stocks, some banks began to conduct

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stock transactions since there was no stock exchange available at that time. The over-the-counter-market was formed accordingly. Under these circumstances, it was necessary to set up stock markets in Vietnam. Two stock markets were set up at the beginning of the 21st century. One is the HoChiMinh Stock Exchanges, which was set up in 2000, the other is the Hanoi Stock Exchanges, which was opened 5 years later, in 2005. [15]

Once the “Doi Moi” scheme was adopted, dramatic economy growth was achieved in Vietnam. Large-scale foreign direct investment flow into the country and the international trade was significantly expanded. From late 1995 to 2004, Vietnam’s GDP growth rate was kept at a high level of over 5% during the next ten years (except the year of 2008). (See Figure1.) The capital market was significantly developed as well. As seen in the table 1, the market capitalization was 461million USD in 2005 while in 2012 it increased to 32,933 million USD, almost 70 times of that of 2005.



Source: WWW.TRADINGECONOMICS.COM/GENERAL STATISTICS OFFICE OF VIETNAM

Figure 1. Vietnam’s GDP Growth Rate

B. Chinese Stock Market

The Chinese Stock Market has a similar background. Since the Chinese government launched a long-term economic development program in the late 1970s, China has carried out economic reforms designed to strengthen its economy by transforming it from a centrally-planned economy into a market-oriented one. The economic reforms initially led to unprecedented economic prosperity. However, it was followed by a large amount of budgetary deficits, shortage of capital supply, and inefficient operation of state-owned enterprises (SOEs). (Qi, B, et al. (2008)). To improve this situation, the Chinese government began to permit the issue of bonds and stocks, attempting to help SOEs to raise funds. China’s capital market emerged under these circumstances. In December 1990, The Shanghai Stock Exchanges was established, and Shenzhen Stock Exchanges was set up in the following year.

The Chinese stock market has been expanding hugely along with the rapid growth of Chinese economy. In 2014, China’s GDP reached 10.36 trillion USD while GDPs in USA and Japan were 17.4 trillion USD and 4.7 trillion USD respectively. China became the 2nd largest economy in the world in terms of nominal GDP in 2014. In the meantime, the

Shanghai stock market has gradually become the leading market in China and one of the most important markets in the world. According to the data compiled by the Paris-based World Federation of Exchanges, in 2009, its shares were worth 5 trillion USD, an increase of 95.7 percent from 2008. The Shanghai Stock Exchange jumped to the third world largest, and Asia’s top stock market by trading value in 2009, unseating the long-reigning Tokyo Stock Exchange. It has been shown that China’s capital markets have experienced the following development procedure.

The Chinese stock market began to emerge as a result of the massive economic transition that was taking place in China. During this period, the Chinese stock market lacked a unified regulatory and supervisory framework. Many problems occurred could not be settled during this period [17]. The well-known “August 10 incident” that happened in Shenzhen exposed the disorder in the market’s development. Unified regulations and supervision became urgently required for the stock market.

In October 1992, China’s State Council established the Securities Committee (SCSC) and the China Securities Regulatory Commission, which propelled the capital markets into an important new stage of development. To attract foreign capital, the Chinese government decided to issue Renminbi-denominated shares to foreign investors, such as B-shares, H-shares, N-shares, L-shares and S-shares [17]. The Chinese stock market developed rapidly during this period despite the problems which needed further improvement of the legal and regulatory frameworks.

The Securities Law, issued in December 1998 and enacted in July 1999, confirmed the importance of capital markets and formalized their legal status in China for the first time. The law was subsequently amended in November 2005. In December 2001, China was admitted to the World Trade Organization (WTO), and further opened its doors to the outside world. The financial sector reforms moved forward again while the capital markets grew broader and deeper.

It is clear that both Vietnam’s and China’s economy have had high growth since 2000, after reform policies were adopted. However, it is necessary to determine how deep the economy growth has been reached. In the follow sections, the comparison of the size, the index time series, and performance of the two markets are conducted.

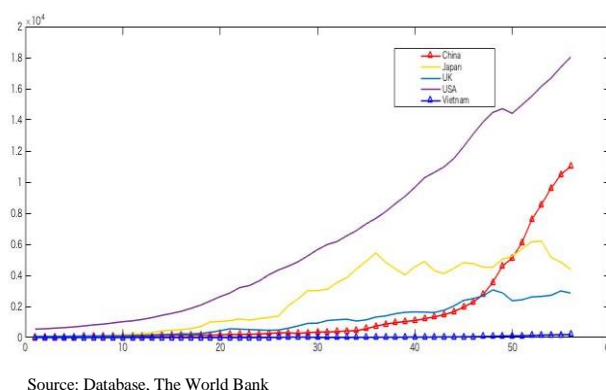


Figure 2. Chinese and Vietnamese GDP (billion US\$)

III. MARKET INDEX

A. Vietnamese Market Index

Vietnam provides three official indices: VN Index, HN Index and UPCoM Index. The UPCoM Index is the newly created index for the Unlisted Public Company Market launched in 2009. VN Index and HN Index are the most popularly applied stock indices in Vietnam, which represent the Ho Chi Minh and Hanoi Stock Exchange respectively. In this paper, time series of VN Index from 2000 to 2014 are examined and analyzed. Indices are calculated from the first day of the official trading session of the market with the base value of 100. Figure 3 shows the movement of VN Index for these fourteen years. Overall movement of the Vietnamese Stock Market displays that, at the very beginning of 2006, the market price rose suddenly, and after a small decline, it increased sharply and entered into a nearly one-year bubble period. The market stock prices hit the all-time peak in 2007 but plummeted by dropping below the price level of 2006 and followed by a long period recession until 2014.

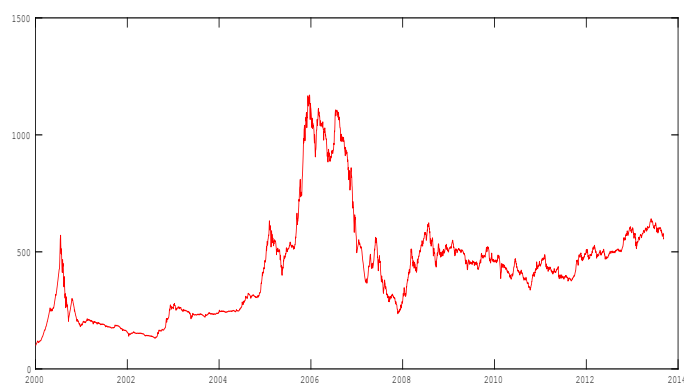


Figure 3: VN Index series

Further, during the period from 2000 to 2005, it can be seen that the VN Index has almost no change except a small increase in 2001. It began to move slightly from the first quarter of 2005 and had small fluctuation for almost one year. It can be supposed that the Vietnam stock market began to be conducted and applied just after the establishment of Hanoi Stock Exchanges. From the first quarter of 2006, the VN Index suddenly moved upwards and then hit its peak at 1170.7, on Mar 12, 2007. It moved comparatively slowly ranging from 1099.3 to 1170.7 for almost eight months and then drops down sharply in late of 2007. From November 15, 2007, it declined sharply until February 24, 2009. The market index slipped down to 235.5, which was the lowest recorded level in its history. After a temporary upward movement, the market fell into a recession period up till 2014.

The reasons for the sudden surge of stock prices from 2006 to 2007 are considered that first, the decision to join the WTO boosted a high expectation for the Vietnamese Stock Market. It drew more and more attentions from the overseas investors and a huge amount of foreign capital flew into the

Vietnamese market. As seen in Figure 4, the value of PER in 2007 is 43.75. Generally, the value of PER is suggested between 12 to 20. The high level of PER explains why the Vietnamese Stock Market was overheated. It is rational to state the Vietnamese Stock Market entered into a bubble period from 2006 to 2007.

However, the stock prices began to fall drastically and dropped to the lowest level in 2009. The reasons for this include the American financial crisis and Vietnam government's deflation policy, which seriously affected the market. Because of the international trade deficit and depreciation of US dollar, huge net sales of stocks result in a sudden drop of Vietnam stock market. Further, the global financial crisis accounts for a deepening the depression of the market.

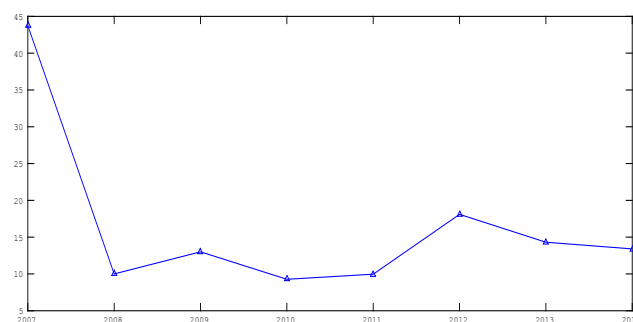
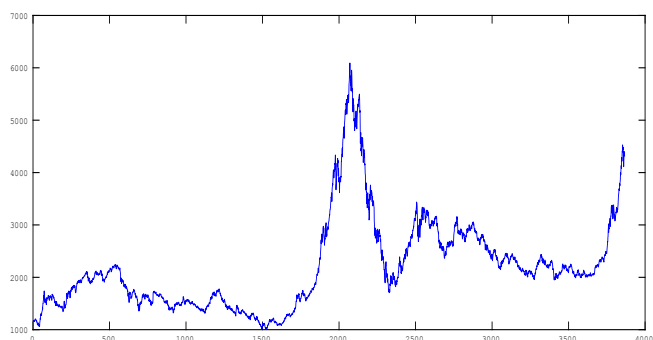


Figure 4. PER of Vietnam Stock Market

B. Chinese Market Index

For Chinese Stock market, the SSE Composite and SZSE Component are the representative indices popularly used. SSE Composite covers all A-Shares and B-Shares, while SZSE Component includes 40 stocks traded in Shenzhen Stock Market. In this paper, SSE Composite (SSEC below) is applied since the Shanghai Stock Market is most important in the Chinese stock markets. The analysis in this section is based on data from March 18, 1999 to March 18, 2014. Figure 5 shows the time series for the SSEC which represents the movement of the Chinese Stock Market. It can be seen that the Chinese stock market kept growing until the second quarter of 2001 with an unexpected sudden drop and which kept slipping down in the next four years. It fell to a bottom in the late of 2005 and then returned to its previous levels in 2006. Furthermore, it jumped up with rapidly and reached its peak at the end of 2006. It is supposed that the bubble began to burst with the decline of stock prices. The decline was not stopped, and finally the market price fell back to pre-2006 levels. After 2008, the SSEC appeared to recover for a short while, and then had another fluctuation wave. From 2011, it kept falling slowly through 2014.



Source: http://upload.wikimedia.org/wikipedia/commons/7/7e/SSE_Composite_Index.png

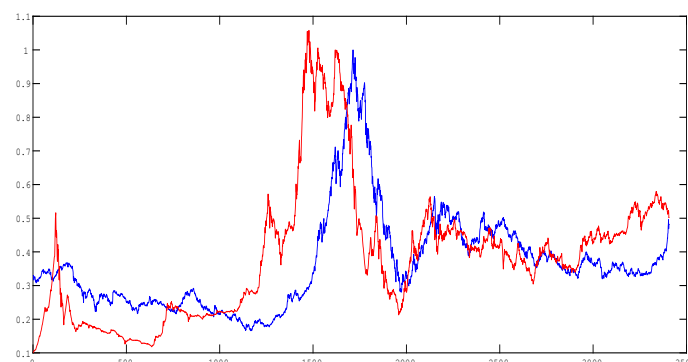
Figure 5. SSEC Index series

Taking a detailed looking at Figure 5, the SSEC reached a peak of 2242.42 points on June 13, 2001 and dropped down 54.8% to 1013.64 points in June 2005. After declining for almost four years, it rose gradually, and then suddenly sped up in the late of 2006. On December 14, 2006, it had a new high of 2249.11 points, which is above the level of 2001. It continued moving up until October 15, 2007 when it broke 6000 points for the first time in its history. The next day, October 16, 2007, it reached the highest level of 6092.06 points. Between November 2006 and October 2007, the SSEC increased approximately 4099.06 points compared to one year earlier. It seems a bubble was formed during a very short one-year period. After late of 2007, the bubble began to burst and the SSEC declined sharply and quickly slipping down during the following year. It dropped to 1820.81 points on December 31, 2008 with a 3440.75 points decline compared to one year earlier.

Comparing the Vietnamese and Chinese Stock Markets, the movements of these different markets display similar shaped reverse “Vs”, which implies that market bubbles occurred from 2006 to 2008. In Vietnam, the bubble appeared one year after the Hanoi Stock Market established. The incompleteness and tenderness of the market can be considered at the beginning of Vietnam’s stock market formation. In China, the stock market bubble appeared during the same period after China’s stock market had been formed over ten years and had been under the process of development and improvement.

To make a concrete comparison, the highest points in both markets can be considered as 100 and then all the data before and after the highest points are recalculated based on the standardized points. Figure 6 re-plots the two series for these two markets.

As shown in Figure 6, the movements of the two series are similar, but the width of movements are actually different. The SSEC expands four times during one year from 2006 to 2007 while the VN rises two times during the same period. After the bubbles burst, the SSEC dropped 72% from 6092.06 to 1706.70 during one year, while the VN dropped 44% during the similar period. It can be concluded that the market fluctuation was much fiercer in China than in Vietnam. However, the movements of the two series are similar while in different scales.



Source: prepared by author based on figure 3 and figure 5

Figure 6. Comparison of two series

IV. PERFORMANCE OF THE TWO MARKETS IN THE WORLD

Table 1 shows the market capitalizations for the major markets in the world in 2005 and 2012. In the NYSE market of 2012, the market capitalization is approximately 18 trillion USD, which is no doubt taking the dominant position in the world. During the same year, China and Vietnam have a total domestic market capitalization at 3.70 trillion USD and 0.32 trillion USD respectively. China’s stock market exceeded the Japanese market and became the 2nd largest market in the world. However, the Vietnam market is still too small-scaled which could not even be comparable with other emerging markets up till recently, because its size is far smaller than any other developed market.

The total market capitalization for the world’s major markets can be calculated as 31,109,265 million USD in 2005 and reached 38,035,898 million in 2012. (Table 1.) The average market capitalization for the whole is 1,829,839 million USD and 2,237,406 million USD in 2005 and 2012 respectively. In 2005, Chinese stock market size was below the average level, at 0.45 times of average value, while the Vietnamese market size was 461 million USD, only 0.00027 of the market average. Compared with 2005, both the markets developed rapidly in through 2012 when the China’s market capitalization exceeded the average at 1.7 times of the market average. It even exceeds the Japanese market, becoming the 2nd largest market in terms of market capitalization in 2012. Meanwhile, the Vietnamese market since 2005 has been expanded widely as well, but it is still far below the average market level, with only 1/68 of the world’s average level 2,132,270 million USD. On the other hand, the numbers of listed companies in the two markets are increased respectively from 1387 and 33 in 2005 to 2494 and 311. Although a big change in the number of listed companies can be seen in the Vietnamese market, it is still displaying a small increase compared with China and other emerging markets. (Table 1.)

Among the BRICs countries, the total market capitalization of the whole BRICs countries reaches 2357063 million USD and 7065220 million USD in 2005 and 2012 respectively. China’s market share owns 33.12% among the BRICs countries in 2005 when the Indian market displayed a large weight of the whole BRICs countries’ market. However, the Chinese market grew up quickly and expanded to be the top market among the BRICs countries, with an increasing rate of 199.74%. Meanwhile, the

increase rate of listed companies from 2005 to 2012 is much bigger than any other BRICs countries. (Table 1.)

If comparing with five emerging countries (Indonesia, Malaysia, Philippine, Thailand, Vietnam), Vietnam has a very small portion of the Southeast Asian emerging market as well, which in 2005 is only 0.11% of these five emerging markets. Although Vietnam has achieved some development, in 2012, its market was merely 2.1% of these emerging markets. Thus, the Vietnamese market is considered to have achieved no significant development through 8 years following 2005. (Table 2.) However, in the southeast area, Malaysia and Thailand market still can have 30% and 25% of the whole emerging market respectively in 2012 even they shrank from their 2005 portions. The Philippine and Indonesia markets have expanded largely and achieved 17% and 25% of these emerging markets. Unfortunately, Vietnamese market share is still extremely low, with only 2% of these emerging markets in 2012. (Table 2.)

Comparing the number of listed companies, Indonesia has gone from 335 to 459, or 1.37 times, Malaysia has gone from 1020 to 921, or 0.902 times. The Philippine from 235 to 268, or 1.14 times, and Thailand from 504 to 502, almost no change. Vietnam has gone from 33 to 311, or almost 9.42 times. Thus, Vietnam's rate of increasing listed companies is the highest among five emerging countries.

The fact displays that Chinese market has successfully expanded from 2005 to 2012, becoming one of the most important markets in the world. During the same time, Vietnamese market performance was unsatisfactory although it experienced many years' reforms. Why did the two governments adopt reforms policies at almost the same time but with totally different economic effects? It is necessary to further analyze these markets. In the following, market efficiency is tested using Hurst Exponent Theory.

Table 1

Market	Market Capitalization (\$ millions)				Market Capitalization (% of GDP)			
	2005		2012		2005		2012	
	Value	Weight	Value	Weight	Value	Weight	Value	Weight
Australia	804,074	0.02585	1,286,438	0.03382	115.9	0.07122	83.9	0.05348
China	780,763	0.02510	3,697,376	0.09721	34.6	0.02126	44.9	0.02862
Hong Kong	693,486	0.02229	1,108,127	0.02913	381.9	0.23468	421.9	0.26893
France	1,758,721	0.05653	1,823,339	0.04794	82.3	0.05057	69.8	0.04449
Germany	1,221,250	0.03926	1,486,315	0.03908	44.1	0.02710	43.4	0.02766
India	553,074	0.01778	1,263,335	0.03321	66.3	0.04074	68	0.04335
Indonesia	81,428	0.00262	396,772	0.01043	28.5	0.01751	45.3	0.02888
Italy	798,167	0.02566	480,453	0.01263	44.7	0.02747	23.9	0.01523
Japan	4,736,513	0.15225	3,680,982	0.09678	103.6	0.06366	62	0.03952
Korea	718,180	0.02309	1,180,473	0.03104	80	0.04916	96.5	0.06151
Philippines	40,153	0.00129	264,143	0.00694	39	0.02397	105.6	0.06731
Russia	548,579	0.01763	874,659	0.02300	71.8	0.04412	43.4	0.02766
Singapore	316,658	0.01018	414,126	0.01089	248.5	0.15271	144.3	0.09198
Spain	960,024	0.03086	995,095	0.02616	84.9	0.05217	75.2	0.04793
Thailand	124,864	0.00401	382,999	0.01007	70.8	0.04351	104.7	0.06674
USA	16,970,86	0.54552	18,668,33	0.49081	129.6	0.07964	114.9	0.07324
Vietnam	461	0.00001	32,933	0.00087	0.8	0.00049	21.1	0.01345
Total	31,109,265	1	38,035,898	1	1,627	1	1,569	1

Source: Author's calculation based on data from World Development Indicators 2014, THE WORLD BANK

Table 2

Market	Indonesia	Malaysia	Philippines	Thailand	Vietnam	Total
Year						
2005	0.190189	0.423308	0.093784	0.291641	0.001077	1
2012	0.255456	0.306685	0.170065	0.246589	0.021204	1

Source: Author's calculation based on data from World Development Indicators 2014, THE WORLD BANK

V. HURST EXPONENT ANALYSIS

Harold Edwin Hurst was a British hydrologist who observed the Nile River while measuring the storage capacity of reservoirs. He also made records of the presence of long-range dependence in hydrology, highly related to the fluctuation of water level in the Nile River. According to the numerous observations, he proposed a new method called as rescaled range methodology to measure the long-range dependence. The Hurst exponent, which has been widely used in finance and other fields, was named after him.

(http://en.wikipedia.org/wiki/Harold_Edwin_Hurst)

A. Hurst Exponent Theory

The Hurst exponent theory can be applied to check whether the time series is a persistent or anti-persistent series. It can be calculated by the rescaled range analysis. A time series X : $X = X_1, X_2, \dots, X_n$ is considered, assuming that, R_t is the range series and S_t is the standard deviation series.

$(R/S)_t$ can be calculated with the following formula:

$(R/S)_t = R_t / S_t, t = 1, 2, \dots, n$. $(R/S)_t$ present the scales by power-law as time increases, which indicates $(R/S)_t = c * t^H$. Here, c is a constant, and H is called the Hurst exponent. To make an estimation of the Hurst Exponent, $(R/S)_t$ versus t in log-log axes is plotted. The slope of the regression line approximates the Hurst exponent.

If $H=0.5$, it can be concluded that the time series follows a random walk pattern, which means it is an independent process and past values do not influence the present values. If $H>0.5$, the time series is persistent which means it keeps a long memory of past information and the current values are highly related to the previous values. In a persistent market, a positive or negative change in a period is likely to be continued in a same trend in the next periods, and even for a long period. If $H<0.5$, the time series is considered as an anti-persistent series which means a high (low) value in the previous period is likely followed by a low (high) value. The anti-persistent case is considered that market is heavily controlled or intervened by the government. Both persistent and anti-persistent markets present inefficient performance. The closer the Hurst exponent is to 0.5, the more likely the time series appears as random so that market becomes efficient. The farther the Hurst exponent is from 0.5, the more

inefficient the market is. In the following paragraphs, the Hurst Exponent Analysis is applied to check one of the important properties of the time series to see whether it is persistent or not.

B. Results

Hurst exponent analysis is conducted to detect whether the time series is random or not, such that, whether the market is efficient can be estimated. In this paper, market efficiency means that the market is fully market-oriented without any government control.

Figure 7 shows the corresponding Hurst exponent result for the VN market from April 6, 2005 to December 10, 2014. Based on daily data, the short-term Hurst exponent for this period can be calculated as 0.193. As previously mentioned, the Hurst Exponent can be applied to analyze whether a time series is persistent or not. If H is bigger than 0.5, the time series is persistent. If it is lower than 0.5, the time series is anti-persistent. If it exactly equals 0.5, the time series is random. From this result, it can be concluded that the time series of VN Index from April 6, 2005 to December 10, 2014 is not a random series but an anti-persistent one. It is then can be inferred that high previous stock prices might be followed by low stock prices. In other words, the Vietnamese government can be supposed to have exerted strong control of the market.

Figure 8 displays the corresponding Hurst exponent result for SSEC time series from January 4, 2005 to December 15, 2014. Using daily data, the short-term Hurst exponent for the period can be calculated as 0.298. This suggests that the time series of SSEC from Jan. 4, 2005 to Dec. 15, 2014 is an anti-persistent series as well.

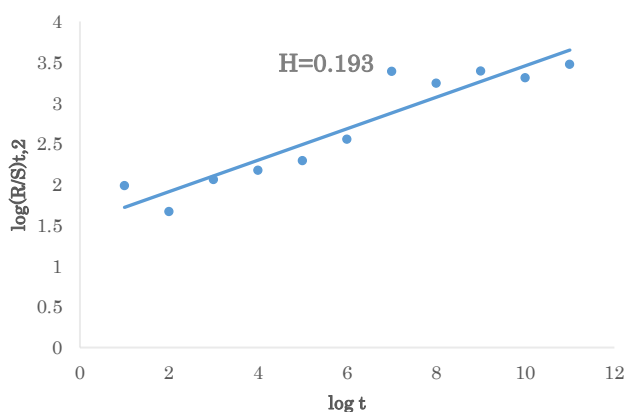


Figure 7. VN Index Hurst Exponent

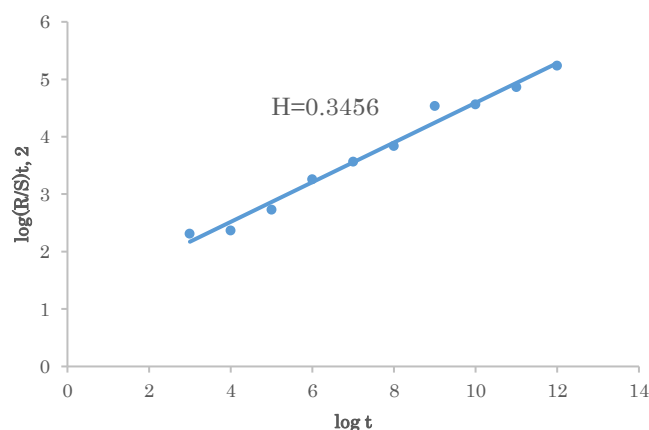


Figure 8. SSEC Index Hurst Exponent

The results suggest that both series are not random but display anti-persistent characteristics. It can then be concluded that both Chinese and Vietnamese governments intervened or controlled their markets. However, the short-term Hurst Exponent value for SSEC is much larger than that of HOSH. According to the Hurst Exponent theory, the closer the Hurst Exponent value is to 0.5, the more the series approaches to randomized values. Further the closer the H value is to zero, the less it approaches to randomized values, and the stronger anti-persistent features it possesses. Therefore, it can be concluded that the SSEC series is closer to random than the VN series. This means the Vietnam government adopted stronger control of its market than the Chinese government. In other words, the Vietnamese stock market is less efficient than Chinese one.

Both countries were once centralized countries and had made great efforts to transform the centralized economies to the market ones. It can be concluded that the great progress has been made in China but few changes have happened in Vietnam.

Figure 9 and Figure 10 present the 10-day term Hurst Exponents for the SSEC and the HOSH. The time period is applied before the global crisis happened, which is from Apr. 6, 2005 to Jun. 6, 2006. As seen in these two Figures, the Hurst Exponent values for SSEC and VNindex are 0.3058 and 0.526 respectively. These disclose a significant difference between the two markets. For SSEC, the long-term Hurst Exponent value is a little bit larger than the short-term one but not so different. While looking the VN market, the long-term Hurst Exponent value is far greater than the short-term one. The results explain that in the Chinese market, no matter checking the long-term Hurst Exponent or the short-term one, the values are similar and closer to 0.5 rather than zero. This means the Chinese market keeps its anti-persistent characteristics over both long term and short term. The Chinese government is supposed to have controlled the market but not so heavily. While, in the Vietnamese market, the long-term Hurst Exponent value is much larger than the short-term one and very close to 0.5. This means that, in the short run, the market is heavily and frequently

controlled by the government, but, in the long run, the market appears to be moving randomly. On the other hand, it can be supposed that the Vietnamese government frequently changes policies and enforces power over the market, which makes the market inefficient in short run. However, in the long run, the market has an efficient appearance.

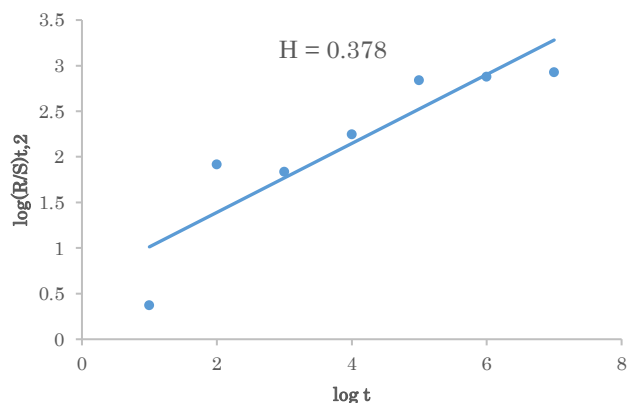


Figure 9 VNIndex Hurst_10 days

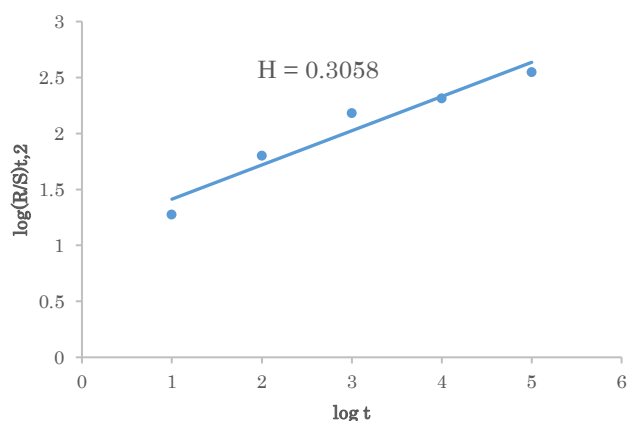


Figure 10 SSEC Index Hurst_10 day

VI. HURST EXPONENT ANALYSIS

In this paper, a comparative analysis of the Vietnamese and Chinese Stock Markets was conducted through checking the formation and performance of these two markets. It is

concluded that the two markets were formed under similar backgrounds but developed completely differently. The Vietnamese market is extremely underdeveloped. By calculating the Hurst Exponent, it is found that the Hurst Exponent for Vietnamese Stock Market equals 0.193, which implies that the Vietnamese Stock Market moves in an anti-persistent way. High fluctuation in previous days might cause low fluctuation in next days. In other words, the results show that Vietnamese Stock Market is not market-oriented but heavily controlled.

While in the Chinese market, the Hurst Exponent is calculated as 0.3058 by using 10 days' data and 0.3456 using daily data. Both results indicate that Chinese market has a movement in an anti-persistent way. However, comparing with Vietnamese market, China's Hurst exponent is much closer to 0.5, which explains that the Chinese market movement is more random. This implies that the Chinese market is more efficient.

The efficiency of Vietnam stock market has been rejected. Since the lower the Hurst Exponent value is, the greater inefficiency of the market is indicated. The value of Hurst Exponent is calculated as 0.193, which is close to zero so that the Vietnamese Stock Market is considered as highly inefficient. Examination of the market performance shows it is inefficient which is in consistence with the Hurst Exponent analysis results. The reason for the underdevelopment of Vietnamese Stock Market can be considered as an inefficiency of the market. It is highly suggested that the Vietnamese government should put less control on the market and open the market more widely to the world.

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