Determining the Ebullient Phases in EFTA Stock Markets

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Abstract

Previous empirical literature supports the idea that stock bubbles have impacts on the efficient allocation of wealth. Researchers targeted various economies in the past using various methods to explore the bubble phenomenon. This study uses the generalized SADF test, which is admitted by empirical literature to be the most successful technique, to explore stock bubbles in three countries included in the European Free Trade Association (EFTA) that have not been studied before. This paper takes the lead and tests for the existence of bubbles in the monthly end index prices of respective countries based on the latest available time series data from January 2001 to September 2019. Based on empirical results, it is concluded that the stock markets of all three countries experienced multiple bubbles during the study period. The case of Iceland is worse, where comparatively more fluctuations in stock prices are seen. To avoid the occurrence of further stock price bubbles in these countries, policy recommendations are provided as well.

Keywords: Periodically Collapsing Bubbles; Generalized Supremum ADF; Explosivity

Introduction

An asset bubble, or market bubble, is a trade in a security at a price that is not justified by fundamentals. The bubble phenomenon is characterized by high fluctuations in security prices. Usually, it extends into three phases. In the first phase, security starts to trade above its intrinsic value. Intrinsic value is the actual value of security calculated by the asset pricing model (Campbell et al., 1997; Cochrane, 2001). The second phase involves a further increase in the market price of security above its fundamental value. As Shiller (2006) observes, the prices of houses do not match rent, and the rent-to-price ratio of the housing sector has been gradually decreasing since 1913. In the third phase, bubbles burst when the market price becomes equal to or less than its fundamental value. Bubbles often take a long time to burst, and their duration can extend up to months. In another way, security may become overpriced, and then its price drops in a moment. For example, empirical results by Yiu et al. (2013) studying the Hong Kong residential property market support the notion. One of the bubbles explored by them started in October 2007 and ended in April 2008. Conversely, some bubbles had the same start date and end date, such as June 2000, October 2004, January 2009, etc.

By looking into world economic history, it can be argued that mispricing in securities has been occurring for a long time. Tulip mania, which occurred in the Dutch Republic, is considered the first economic bubble when contract prices for tulip bulbs started to increase tremendously in 1630.

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The escalation in price continued for about seven years, and then suddenly, in 1637, prices dropped. Similarly, bubbles have been observed in various asset classes**.** The South Sea Bubble occurred in 1720 when the stock price of the South Sea Company of Britain increased eightfold in six months from January to June of that year. When it burst in September of the same year, government stocks also dropped. The most recent study conducted by Vogiazas and Alexiou (2017) provides evidence of property price bubbles in OECD countries. OECD is abbreviated for the Organization for Economic Coordination and Development. It is a group of seven countries: Australia, Belgium, Canada, Denmark, Great Britain, Norway, and Sweden.

Exploring the asset bubble is important due to its negative consequences, as shown by previous studies. For example, IMF (2003) identified 20 cases in 14 countries from 1970-to 2001 when bubble bust led to recession. Similarly, Ferguson (2008) and Ahamed (2009) argue that financial crises are often preceded by asset bubbles. American subprime mortgage crises (2007, 2009) are no exception. Before the crises, high inflation was seen in the housing sector which was financed by home mortgage loans. The boom in both the real estate and credit market was understood by market observers and from time to time they show their concerns about mispricing in these markets. Such as Shiller (2005) and Pettifor (2006) document that risk is not properly reflected and priced in both the housing and credit markets. Similarly, Bank of International Settlements expressed in their reports repeatedly that prices in financial markets are not based on fundamentals. However limited attention was given to this news and behaviour of investors did not change. As a result, the bubble continued to become large and eventually busted. It resulted in huge losses not only for real asset investors, mortgage loans providing banks specifically and the American economy generally but also its effect was spread in the rest of the world.

Recently, the long sequence of increases in stock prices of the American stock market followed by a dramatic price drop in October 1987 and Japan's stock market inflation spanning from 1985 to 1989 have sparked new interest in stock price bubbles. A stock price bubble occurs when share prices deviate from their fundamental value. It is the difference between the market price and the intrinsic value of the stock (Reza, 2010). In a rational speculative bubble stock holders know that stocks price exceeds their intrinsic values. In other words, it is bullish market sentiment generated through rational speculation about stocks. Despite having information that shares are overvalued, stockholders continue to invest more and more with the belief that prices will go up further and will not decrease. But the continuous increase in share price is unexpectedly followed by a downfall.

Using a recently developed test—the Generalized Supremum Augmented Dickey-Fuller (GSADF) by PSY (2015), the case of multiple bubbles in EFTA countries is explored. The study period includes bubbles of both short and long duration. The period of the short bubble is two months which occurred in Norway stocks from May to July 2014. The long bubble is identified in Iceland stocks having 38 months duration. It started in May 2003 and ended in June 2006. The next long bubble is explored in Norway stocks for a duration of 37 months extended from November 2004 to December 2007. As stock markets of developing countries are characterized by high price fluctuations, exploring the stock market behaviour of developed countries such as EFTA would be a significant contribution to the existing empirical literature. This study will work as a base for academicians doing research in the area. Similarly, regulators in these countries will formulate strategies to reduce the occurrence of such bubbles in future.

The organization of the paper is as follows: section II provides a brief review of stock exchanges operating in EFTA countries. Section III reviews relevant literature. Section IV describes the

empirical methodology. Section V presents empirical findings and part VI elaborates conclusions and policy implications.

Brief Overview of EFTA Countries Stock Exchanges

EFTA is an organization of four European states i.e. Iceland, Liechtenstein, Norway, and Switzerland developed for promoting free trade among member nations. To identify stock bubbles in EFTA countries, stock market indices of respective countries are studied for 19 years from January 2001 up to September 2019. A brief review of stock exchanges operating in these countries and its popular indexes are presented here.

Also known as Nasdaq Iceland, the Iceland Stock Exchange was established in 1985. Initially, it began trading in 1986 in government bonds whereas the exchange started trading in equities in 1990. The OMX Iceland All-Share Price Index used in this study is a major stock market index of the Iceland Stock Exchange (ICEX). It is based on a variety of financial and non-financial firms such as fishing, retail, transportation, banks and insurance. Oslo Stock Exchange (OSE) is the main market for trading shares of Norwegian companies. Although OSE started operations in April 1819 (as Christiania Bors), stocks were beginning to trade from 1 March 1881. Not only domestic but international companies in petroleum and shipping sectors etc. are also registered on OSE. The Oslo Bors All Share Index (OSEAX) is included in the study to identify multiple bubbles, if any, in Norway stocks. It consists of all shares traded on OSE. It is a share price index adjusted daily for corporate actions such as dividends or coupon payments stock splits etc. SIX Swiss Exchange is Switzerland's stock exchange. Along with shares other securities such as government bonds and derivatives such as stock options are also traded on SIX Swiss Exchange. The Switzerland Market Index (SMI) is incorporated in the study to explore multiple bubbles in Switzerland's stock market. SMI was introduced on 30 June 1988. It is made up of the 20 largest equities of the Swiss Performance Index (SPI) and is updated whenever transactions in securities contained in the index occur. The securities of SMI collectively represent more than 90 percent of the market capitalization and 90 percent trading volume of all Swiss and Liechtenstein equities.

Literature Review

The world economy has seen many ups and downs in asset prices. Most recent is a persistent increase in American stock prices followed by a sudden decrease in 1987. Such fluctuation in the stock market is one of several puzzles not explained by efficient market hypotheses (Shiller, 1992, pp. 69-130). On the other hand, some researchers argue that the use of efficient market models for testing the presence of a stock price bubble is important, as it is helpful in investment decision-making (Nartea & Cheema 2014). The vast amount of research is devoted to identifying these bubbles (e.g. Jahan-Parvar & Waters, 2010; Mokhtar et al., 2006; Cunado et al, 2005; Nasseh & Strauss, 2004; Bohl & Henke 2003; Crowder & Wohar, 1998; Timmermann, 1995; Froot & Obstgeld, 1991). Results on bubble identification are however contradictory. For example, using cointegration tests Sarno and Taylor (1999) found rational bubbles in the stock market of Malaysia over 10 years from 1988 to 1997. However, earlier studies by Chan et al. (1998) applying the duration dependence test did not find evidence of stock price bubbles in Malaysia during the study period extended from 1977 up to 1994.

The tests of identification can be broadly categorized into five groups The first category of tests examines excess volatility in actual stock prices. These tests which are initiated by LeRoy and Porter (1981) assuming linearity in time series compare the variance of the stock's market price with a variance of the fundamental value of the stock. If the variance of the former is greater than

latter then it is an indication that a speculative bubble is present in stocks. Using both aggregated and disaggregated data on the price and earnings of US firms these authors identified volatility in stock prices. Shiller (1993) conducted research on the S& P composite stock price index and Modified the Dow Jones Industrial Average by applying the same method and found volatility in stock prices. Kleidon (1986) is among others who identified stock price volatility by comparing actual stock price variance with a variance of the fundamental value of the stock.

The second category of tests uses bubble premium to identify bubbles. These tests were proposed by Hardouvelis (1988). A bubble premium is defined as the extra return expected by investors in the presence of bubbles. Due to this extra return, investors decide to stay in the market despite having information that stocks are overvalued and prices will drop. Studying Japanese, American and UK stock markets data for 10 years starting from December 1977 to December 1987, he finds positive and increasing bubble premium which is a sign of speculative bubbles. Rappoport and White (1991) also detected a bubble in the 1929 American stock market by this method.

The third set of tests for rational speculative bubbles is specification tests introduced by West (1987). In these techniques initially, parameters of the discounted present value of dividends are estimated in two different ways. Such as firstly through regressing stock return on dividends; and secondly through the Hansen–Sargent prediction formulas. Then two sets of parameters are compared. If difference exists then a bubble is present. West identified bubbles in this way in American stock markets using samples, S&P 500 index (1871-1980) and Dow Jones Index (1928-1978). Dezhbakhsh and Demirguc-Kunt (1990) also tested the existence of stock price bubbles by using the methodology of West (1987).

The fourth set of tests examines whether dividends and prices are correlated. Diba and Grossman (1988) detected bubbles in the American stock market by applying a cointegration test on the S& P composite Price Index. These tests investigate stationarity property in dividends and stock prices time series. The idea is that if bubbles exist then prices and dividends do not co-move i.e. relation between two variables is no longer linear. Sarno and Taylor (1999) using such methodology found evidence consistent with the presence of stock price bubbles in all East Asian economies except Australia where no stock price bubble was identified in the period of the study (1988 to 1997). Arshanapalli and Nelson (2008) applied the cointegration technique to find the housing bubble in the US in the period 2000-2007.

The fifth group of tests is duration dependence tests. McQueen and Thorley (1994) detected bubbles in the New York Stock Market in the period 1927-1991 through this method. As suggested by the authors runs of positive abnormal returns will be followed by negative returns if the bubble is present in asset prices. Mohktar et al. (2006) using the test detected bubbles in the Malaysian stock market in the pre and post-era (1994-1996 and 1999-2003 respectively) of the 1997 Asian financial crises. However, Ali et al. (2009) applying the same technique in the Malaysian context finds no evidence of bubbles over a longer period (1989-2006). Wang and Wong (2015) detected bubbles in the US stock market in a period extended from January 1927 to December 2012 by employing a duration dependence test on monthly real return. Besides these tests, researchers have also used other techniques for bubble identification. Such as using recursive computations Asako and Liu (2013) employ an estimation model to detect bubbles. Further, Anderson and Brooks (2014) developed an empirical asset pricing model for bubble detection. If parameter estimates are affected by stock returns, then this is an indication of the bubble.

Econometric Methodology

Before recent techniques, one developed by Dickey and Fuller (1979)—the Augmented Dickey-Fuller (ADF) unit root tests were mostly used to test bubbles in asset prices. One of the issues raised in the ADF test is its inability to detect multiple bubbles in a time series (Fatima & Ahmed, 2019). Further researchers explored that bubbles are periodically collapsing and originating. To cope with such circumstances our methodology to explore bubbles is based on the PWY (2011) and PSY (2013). By applying the procedure followed by popular research we become able to explore any bubbles that occurred in stock prices clearly showing both the date of origination and the date of burst of the bubble. We regress the following model for this purpose:

$$Y_t = \rho 1 + \rho 2 Y_{t-1} + \sum_{k=1}^{n} \theta_k \Delta Y_{t-k} + \varepsilon_t \quad (1)$$

In the above equation, Y denotes index price, ρ1 is the intercept term, ρ2 is the coefficient value of the first leg of, and is the coefficient value of. is an error term having zero mean value and constant variance. To detect bubbles, we test the null hypothesis of ρ2 = 1 against right right-tailed alternative hypothesis of ρ2 >1.

To make understanding easy test procedure is described here. In first step sample data is normalized so that it lies in [0,1] interval. Let $ADF_{s1,s2}$ and $\rho 2_{s1,s2}$ are two ADF statistics of estimated coefficient of Y_{t-1} in specified equation (1) of normalized sample [s_1, s_2]. Here s_1 and s_2 are initial and last observations of selected sample respectively. Corresponding window size is $W_S = s_2 - s_1$. When window size $W_S = 1$. It implies that the critical values of RTADF statistic will be different from the usual ADF unit root test. To test already developed null hypothesis, RTADF calculated values are compared with the critical values at 1%, 5% and 10% significance levels. If calculated value is found to be greater than corresponding critical value, then we are justified to reject null hypothesis and presence of explosive bubble in data has been proved.

Based on ADF statistic but advanced one technique for bubble detection is SADF test. The test has fix starting point to select sample of varying window size. As proposed by PSY (2015) the initial window size is selected by $(0.01 + 1.8\sqrt{T})$. In the window size estimation first observation of the sample is placed as a starting point S_1 i.e. $S_1 = 0$ and the endpoint S_2 is set to minimal window size W_s. In other words, end point of window $S_2 = W_s$. Then regression is run recursively by augmenting the window size $S_2 \in [S_0, 1]$, one observation at a time and ADF statistic ADF_{s2} is calculated for each estimation. However, estimation carried out in the last step is based on whole sample i.e. $S_2 = 1$ and the corresponding statistic is ADF_1. The SADF statistic is the supremum value of ADF_{s2} sequence for $S_2 \in [S_0, 1]$.

$$SADF_{s0} = \underbrace{sup}_{s2\epsilon[s0,1]} \{ADF_{s2}\}$$

PSY (2015) suggested generalized form of SADF to which they name GSADF. Latest version has greater scope due to formation of different size windows to perform regression analysis. In this process initial window size S_2 can differ inside the given range of [0, $s_2 - s_0$].

$$GSADF_{s0} = \underbrace{sup}_{\substack{s2\epsilon[s0,1] \\ s1\epsilon[0,s2-s0]}} \{ADF_{S1}^{S2}\}$$

Date Stamping of Bubbles

One of the important characteristics of both SADF and GSADF techniques is that it identify bubble origination and termination dates in case of explosive bubbles in data. Date stamps of bubbles are estimated in GSADF test as follows:

$$\widehat{s_e} = \underbrace{inf}_{s2\epsilon[s0,1]} \{s_2 : BSADF_{s2} > critic_{s2}^{\delta Ts2}\}$$

$$\widehat{s_f} = \underbrace{inf}_{s2\epsilon[se,1]} \{s_2 : BSADF_{s2} < critic_{s2}^{\delta Ts2}\}$$

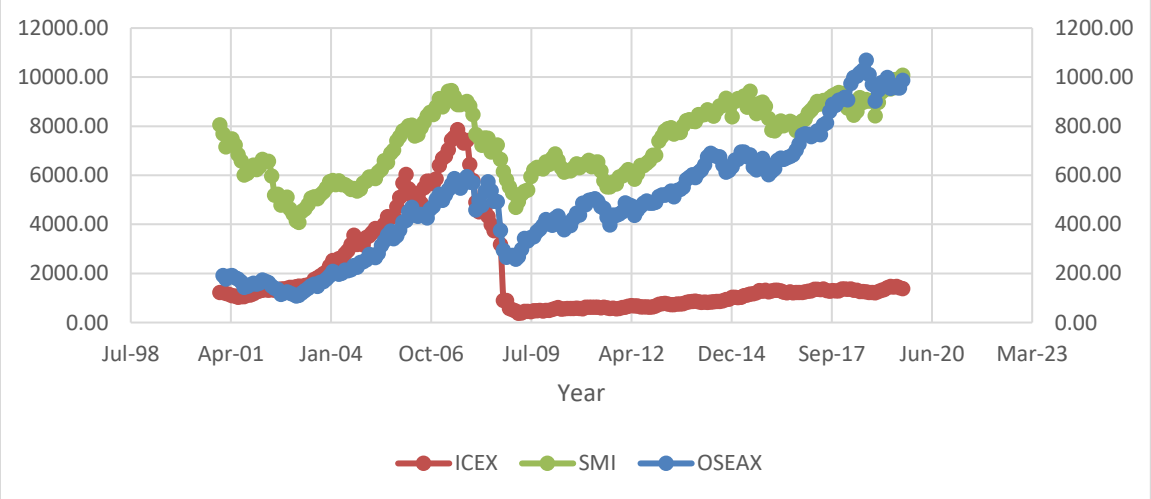
The critical value of sup ADF statistic is $critic_{s2}^{\delta Ts2}$ i.e. 100(1- δT)% which is based on [Ts2] observations. The value of backward sup ADF statistic is $BSADF_{s0}$ for $S_2 \epsilon [S_0, 1]$ that can link to GSADF by noting this

$$GSADF_{s0} = \underbrace{sup}_{s2\epsilon[s0,1]} \{BSADF_{s2}\}$$

Data and Sources

This study uses monthly end stock price indexes from January 2001 to September 2019 of three EFTA countries i.e., Iceland, Norway and Switzerland. That was the period when major structural reforms were introduced in these countries. Such as the privatization of the banking sector in Iceland in 2003. Privatization made it easy to get loans, and people became able to invest a lot of money in the stock market. Prior to 2014, crude oil prices increased and new oil was discovered in Norway, which boosted the economy and increased demand for stocks, consequently increasing their prices. Similarly, in 2008, financial crises peaked in the US, which triggered a panic in financial markets globally. The indexes used are Iceland Stock Exchange Index (ICEX), Oslo Bors All Share Index (OSEAX) and Swiss Market Index (SMI) respectively. Reason for using index prices is that it represents aggregate of stocks of large capitalization companies. The choice of using large time period is made to cover maximum data. Where end of month's stock price index was not available, month's latest index price was considered. Note that, in addition to Iceland, Norway and Switzerland, EFTA also includes Lichtenstein as well, but Lichtenstein has no regulated stock exchange and its companies are trading on Switzerland Stock Exchange. Thus, bubbles in Lichtenstein and Switzerland are explored by studying Swiss Market Index. Source used for data collection is investing.com. Figure 1 shows graphical presentation of all three indexes considered in this study.

Figure 1: Graphical View of EFTA Countries Stock Indexes



From figure 1, it can be seen that all three graphs have same upward and downward trend. Further as depicted all three graphs have remarkable peaks during years 2007-2008. It shows that three

stock markets are cointegrated. SMI is trading at higher price during study period comparative to other indexes. Graphs of OSEAX and ICEX show little difference in both prices from 2001 to 2008. However after 2008 difference in prices becomes large which continuously becomes vast till end of the study period. It is due to tremendous decrease in ICEX prices starting after 2008.

Table 1: Descriptive Statistics of EFTA Countries Stock Indexes

Statistic	ICEX	OSEAX	SMI
Mean	1976.335	490.478	7284.942
SD	1833.425	244.629	1466.424
Median	1275.045	481.100	7399.190
IQR	1627.800	366.235	2530.960
Min	386.800	109.020	4085.600
Max	7867.880	1069.140	10078.320
Skewness	1.604	0.387	-0.097
Kurtosis	4.492	2.471	1.830

Table 1 provides description of three index prices, which clearly justifies graphical report of data. SMI has higher mean price than ICEX and OSEAX. Among three time series data OSEAX has lowest average value. In consistency with mean price are maximum and minimum values of indexes. SMI has highest minimum and maximum values than remaining two indexes. Also OSEAX has lowest minimum and maximum values among group of indexes. ICEX has highly dispersed data as shown by comparatively higher standard deviation than other indexes. This may be due to sharp decrease in ICEX prices after 2008 as viewed by earlier graphical presentation.

Empirical Findings

Table 2 shows test statistics and critical values for each index. All three test statistics for ICEX and OSEAX indexes are greater than their respective 1% right-tailed critical values. For SMI index only calculated RATDF is greater than 1% critical value. SADF value of the index is insignificant at all conventional significance levels, while its GSASF value is significant at 10% significance level. Thus, our results confirm that data have explosive sub periods and countries experienced speculative bubbles in studied period. To locate bubble periods, we compare GSADF statistics sequence with critical values sequence.

Table 2: **Calculated and critical values of test-statistics**

Index	RTADF	SADF	GSADF
ICEX	4.45 (0.00)	5.91 (0.00)	5.91 (0.00)
OSEAX	1.42 (0.14)	3.32 (0.00)	3.33 (0.00)
SMI	1.98 (0.03)	0.22 (0.46)	2.032 (0.07)
Critical Values			
99%	0.72	2.05	2.69
95%	0.00	1.42	2.11
90%	-0.36	1.12	1.88

Table 3 lists date stamping of bubbles occurred in respective stock market. It includes the details on the bubble start and end period as well as the total duration of bubbles in months.

Table 3: Bubble date stamping

Iceland Stock Market Index— ICEX			
Ser	**Start Period**	**End Period**	**Duration (months)**
1	2003M05	2006M06	38
2	2005M08	2007M10	27
3	2008M10	2009M04	6
4	2015M01	2016M06	18
Oslo Bors All Shares Index— OSEAX			
1	2004M11	2007M12	37
2	2014M05	2014M07	2
3	2017M09	2018M10	14
Switzerland Stock Market Index—SMI			
1	2005M09	2006M04	7
2	2006M07	2007M06	12
3	2008M11	2009M04	5

Past studies (e.g., Ahmed et al., 2010; PSY, 2011; and Chang et al., 2016) consider speculative bubbles originated as a result of various political and economic events. From viewing date stamps on economic bubbles, it is evidenced that all three stock markets face with huge mispricing of stocks during periods of 2007 and 2008. This may be the result of economic meltdown during the periods (Al-Rjoub & Azzam, 2012; Hasan & Mohammad, 2015). Thus, like other economies, EFTA countries too are affected by 2007-2008 world economic crises.

In case of Iceland, tremendous increase was seen in prices of Iceland stocks long before in 2003. This escalation in prices may be the result of privatization of banking sector of Iceland. Privatization made easy access to get loans and people became able to invest a lot of money in stock market. Due to which demand for stocks increased escalating share prices. Equally affecting by world financial crises 2008, government of Iceland revised their monetary policies such as imposing capital controls. Currency restrictions were enforced to diminish negative effects of the crises on economy. But as suggested by Chordia et al. (2008) decreased liquidity increase market inefficiency. Efficient market hypothesis also supports the notion that regulated market with capital control decrease availability of information which leads to inefficient market. Thus, market inefficiency can be observed after global financial crises as evidenced by bubble 2015/2016 afterwards. This bubble can be attributed to financial regulations in Iceland.

Norway stocks experienced explosive bubbles in study duration. First bubble started in November 2004 remained for more than 3 years eventually ended in December 2007. This may be the result of spillover effect of Iceland stock market and global financial crises 2007-2008. After, mispricing is observed in Norway stock market during period from May 2014 to July 2014. This may be due to increased crude oil prices and new oil discoveries in Norway prior to 2014. Which boost the economy and increase demand for stocks consequently increasing their prices. Fall in oil prices in summer 2014 dropped share prices consequently busting bubble. Another bubble was originated in September 2017 and ended in October 2018. The history behind the bubble is that after experiencing two years of economic downturn, the Norwegian economy recovered from the oil shock in 2017. GDP growth rose to 1.9% in 2017. Growth of the mainland economy can be

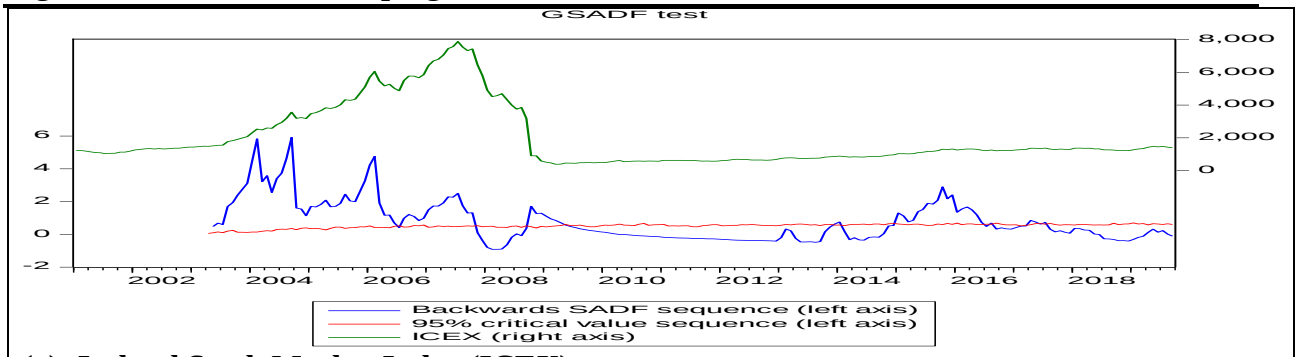
attributed to rising oil prices until September 2018. Further along with increase in oil prices, increase in both investment and income is observed during the period

Three bubbles are detected in Switzerland stock market, which cover period from 2005 and 2009. First bubble extended from September 2005 to April 2006 may be due spillover effect from Iceland and Norway stock markets, which affected Switzerland stock market. Second and third bubbles covered periods of world economic crises of 2007-2008 and therefore may be attributed to the economic turmoil.

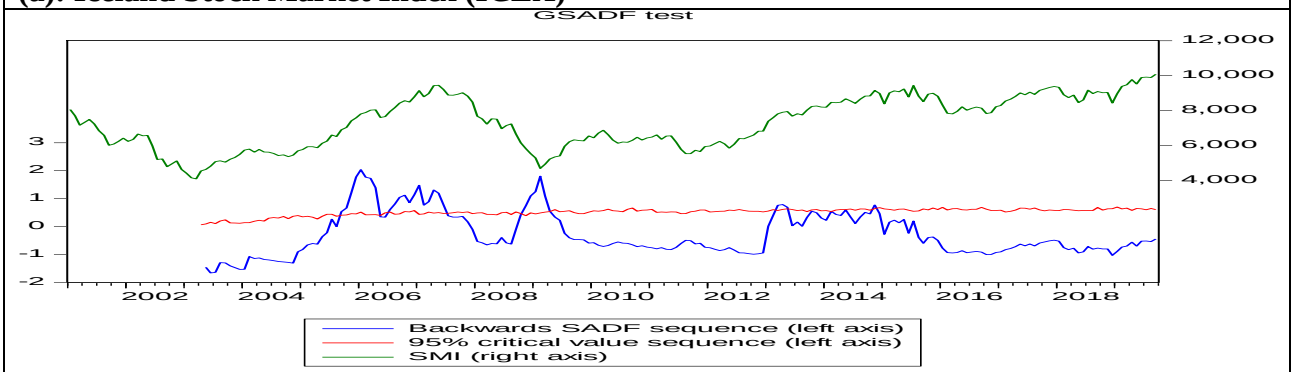
The results presented in this paper are not directly comparable with other studies because no prior study is available on testing and detection of stock bubbles in EFTA countries. However researchers used other contexts for testing bubble in stocks. PSY (2013) using GSADF test find bubble for S&P 500 price dividend ratio during 2008-2009. They attribute price exuberance to subprime mortgage crises. Using same method this study also detected bubbles in all three stock indexes during period extended from 2007 up to 2009. Chen et al. (2015) examined stock bubbles in four stock markets e.g. the US, Belgium, Denmark and Finland for various time periods ending in December 2012. Applying univariate unit root tests on log dividend yields their study provides evidence for bubbles in these stock markets. Whereas in this study also, those identified during 2007-2009 are not the only bubbles. The phenomenon exists in targeted stock markets of the study both prior and after the above-mentioned period.

The results regarding date stamping of identified bubbles for all three stock indices presented in table 3 are portrayed graphically via figure 2 (a—c).

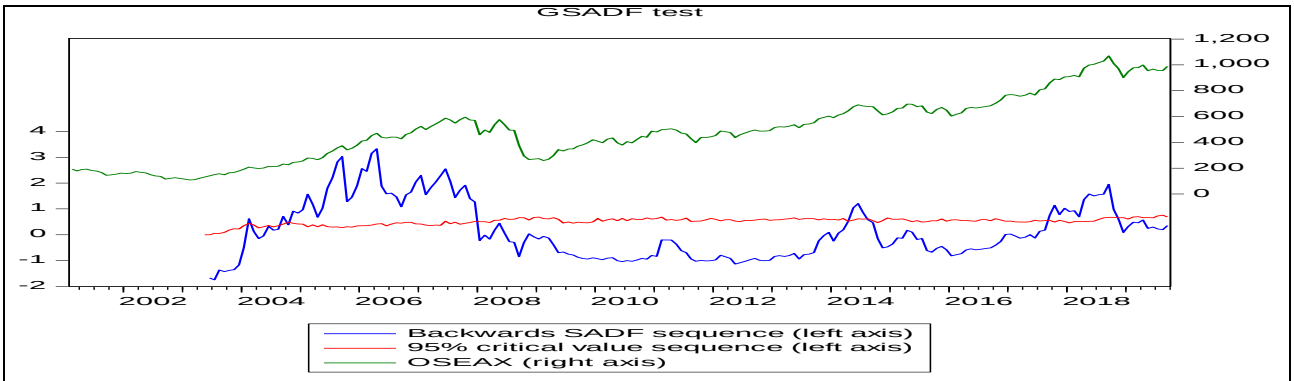
Figure 2: Bubble date-stamping for EFTA countries



(a): Iceland Stock Market Index (ICEX)



(b): Oslo Bors All Shares Index (OSEAX)



(c): Swiss Market Index (SMI)

Conclusion and Policy Implications

The major aim of this paper is to identify multiple stock price bubbles in EFTA countries namely Iceland, Liechtenstein, Norway, and Switzerland. We applied GSADF test on our monthly end stock price indexes. This technique was also used by PSY (2011) for multiple bubble identification in S&P500 price dividend ratio. The null hypothesis of no bubbles is rejected for all stock markets and it is concluded that EFTA countries face with multiple price booms and busts in study period from January 2001 to September 2019. Results of the study show that all three stock markets face with huge mispricing of stocks during periods of 2007 and 2008. Another market inefficiency can be observed in Iceland as evidenced by bubble 2015/2016 in ICEX. Mispricing is observed in Norway stock market during period from May 2014 to July 2014. Another bubble was originated in OSEAX in September 2017 and ended in October 2018. Three bubbles are detected in Switzerland stock market (SMI). First bubble extended from September 2005 to April 2006.Second and third bubbles covered periods of world economic crises of 2007-2008.

This study has important policy implications for EFTA countries. Previous empirical literature supports that bubble phenomenon results in redistribution of wealth and have negative consequences for both capital market participants and firms. Therefore, EFTA countries need to revise their monetary and fiscal policies to reduce chances of further bubbles in their respective countries. Such as regulatory authority should tighten monitory policy when stock price increase and ease it when prices fall to stabilize share prices. Also one of the causes of mispricing is information asymmetry. Therefore other than macroeconomic reforms, actions are needed at firm level to eradicate bubble occurrence. To enhance financial transparency managers should disseminate important information on firm operations which will be helpful in efficient resource allocation.

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