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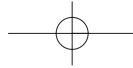


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# 1. ROOTS OF STOCK MARKET VOLATILITY AND CRISES: A SYNTHESIS AND SUGGESTED SOLUTIONS

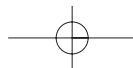
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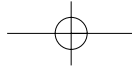
## ABSTRACT

*This paper aims to explore causes and interpretations of stock market crises and high price volatility existing in practices, as well as in state of arts, in order to articulate and classify such interpretations, in comprehensive various models. The study found that the causes and interpretations of stock market crises reside in various models including: overreaction model, adverse impact of related laws, increasing linkages model, transmission of volatility model, adverse impact of derivatives' model, adverse impact of related markets' model, impact of volume volatility model, and econophysics' model of stock market crises. Accordingly, the paper suggests possible remedies to curb the possible causes of stock market instability, based on the presented interpretations of stock market crises.*

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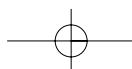
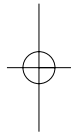
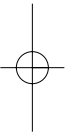


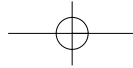
## 1. INTRODUCTION

The paper aims to examine the causes of stock market crises and the existing high price volatility. The world stock markets witnessed major significant changes in the last two decades that need to examine carefully the issue of stock market instability; including liberalization of stock markets, integration and increasing linkages, between the world stock markets, increasing size and importance of stock market in the world economy. The world stock markets moved to adopt more rules that are liberal and thus removing restrictions imposed on foreign trading. The number of regulatory changes that are favorable to foreign investments increased from 80 states to 146 states between 1991 and 1998 (UNCTAD, 1999). In addition, there are thirty-five emerging states, which removed the ceiling of ownership for listed stocks fully by the end of 1998, and seventeen states removed it partially (IFC, 1999).

Liberalization of the related regulations moved stock markets towards integration and increased linkages between various stock markets. Evidence for that may be found in the following facts: Increasing the net private portfolio flows across developed and emerging markets. Increasing number of firms issuing equity in multiple international markets. Increasing number of cross listed corporations in international stock exchanges. Increasing number of the cross listed international corporations in emerging stock exchanges. Increasing linkages between developed stock markets and emerging stock markets (Sabri, 2001a). The size of the world stock markets has increased so rapidly in the last few years. For example, the world stock market value increased from \$5,515 billion in 1990 to \$22,874 billion in 1998. The world number of listed companies increased from 25,424 to 47,456 stocks. The world stock capital increased from \$9,499 in 1990 to \$27,462 billion in 1998 (IFC, 1999). This means that the world stock traded value increased four times, the world stock market capitalization increased three times, and the world number of listed companies increased two times in the last decade.

The above new major changes which occurred in the world stock markets created new phenomena, which is related to increasing instability of stock prices and high volatility that may lead to major stock market crises under certain conditions. Instability of stock prices led to major stock crises, such as the crashes in October 1987, October 1989 and in 1997–1998. The high stock price movements raised the question of the stock market efficiency. Stock prices are expected to respond to accounting data, dividends, and economic facts under the hypothesis of market efficiency. In addition, monthly changes ratio (up and down) in stock prices indices reached in many of the international stock exchanges two digit figures during the nineties – this is not justified by the market or economic rules.





Liberalization, integration, increasing linkages may provide major advantages such as liquidity, but are associated with transmission of high volatility of stock price movements, which may lead to stock crises under certain conditions. The liberalization, integration, and increasing linkages between the world stock exchanges created new factors that may lead to stock market instability. Accordingly, this paper is devoted to discuss the issue, in the light of the new developments that occurred in the last decade. It aims to discuss the issue of instability of stock market prices, and conditions associated with this phenomenon.

The above issues are discussed based on scrutinizing the related literature of empirical studies dealing with the stock price volatility, and market inefficiency. Moreover, it discusses possible reforms of stock trading. The remainder of this research is organized in the following sections: In the next section, size and significance of stock market volatility and stock market crises is presented. In Section 3, the concept of stock market efficiency is explored. Section 4 is devoted to explore the models and interpretation of the stock market crises as alternatives to the efficiency models. Section 5 is devoted to discuss suggested remedies to cope with stock markets crises. A summary and concluding remarks for the study are reported in the last section.

## 2. VOLATILITY AND STOCK MARKET CRISES

The concept of stock market efficiency is based on various assumptions: First: prices of shares fully reflect all related available real economic data. The historical price movements predict future prices and it over-reacts to information, all data are reflected in the stock prices whether publicly available or not and over-reaction to information is about to be common as underreaction (Fama, 1970, 1991, 1998). Second: the fundamental data of stock markets include earning announcements, dividends announcements, repurchasing of shares announcements, price earning ratio, book value ratio, and other economic information including inflation, economic growth and monetary policy. Third: investors, brokers, and speculators will act in a rational way in dealing with stock market transactions. Fourth: liberalization of stock market rules will increase information to parties concerned, thus producing relevant prices.

Various empirical researches suggesting that the concept of efficiency in the stock market is facing challenges. This is presented in the next sections of this paper, as well as in the behavior of stock prices during the last fifteen years. Contrary to stock market efficiency, irrational movements of stock prices; frequent crises and extraordinary high volatility in stock prices in various periods during the last fifteen years is found. In addition, the ratio of changes

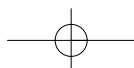
in stock prices indices reached in many of the international stock exchanges two digit figures during monthly or even weekly transactions, which are not justified by the market or economic rules according to the concept of the stock market efficiency.

For example, the average rate of price indices for the major twelve international stock markets fell down about 22% during 1990 (ASE, 1991). The very high price fluctuations – up and down – continued in 1991, 1992, 1998 and 2000. To indicate the increasing phenomena of stock market high price volatility, Table 1 presents examples for the price movements in unstable periods of the major stock market local and global indices from 1986 to 2000.

**Table 1.** Declining of Local Price Indices During Stock Market Crises and Extraordinary High Volatility Periods for Major Developed and Emerging Stock Markets.

Countries	End 1986– End 1987 in % <sup>a</sup>	End 1989– End 1990 in % <sup>b</sup>	End 1996– End 1997 in % <sup>c</sup>	End July– End August 1998 in % <sup>d</sup>	End February– End March 2000 in % <sup>e</sup>
Australia	-10.5	-22.4		-8.2	-1.16%
Japan, Nikkei	+10.9	-49.7	-21.0	-14.9	-27.27%
Hong Kong	-8.1		-27.0	-10.0	-28.99%
Amsterdam		-17.0			-16.42%
Singapore		-21.1	-41.0	-15.7	-26.54%
Toronto, Composite				-20.2	-19.60%
London, FTSE		-11.4		-10.0	-14.86%
Brussels	-10.8	-24.4			
Milan	-42.0	-25.0			-14.09%
Paris	-29.4	-25.2		-12.6	-16.74%
Zurich	-25.4	-5.0		-18.1	-2.44%
New York		-4.2		-15.1	-8.04%
Germany	-47.2	-22.0		-17.7	-24.48%
South Africa	-7.7	-8.6	-6.9	-29.9	
Korea		-24.5	-42.0	-9.7	-49.24%
Malaysia, Composite		-10.5	-52.0	-24.8	-44.55%
Taiwan, Taipei index		-52.9		-14.4	-41.17%
Thailand, Bangkok		-40.4	-55.2	-19.6	-27.07%
NASDAQ					-59.76%
IFC General		-40.9		-25.5	-16.4%
Latin America, IFC		-8.1		-44.6	
Asia, IFC		-46.6		-16.8	-44.9%
Europe, Meddle East Africa, IFC				-28.4	

Sources: <sup>a</sup>: FGSE, 1990; <sup>b</sup>: ASE, 1991; <sup>c</sup>: HKSE, 1999; <sup>d</sup>: IFC, 1999, Frankfurt Fact Book, 1999, and HKSE Fact Book, 1999; and <sup>e</sup>: IFSE, 2001.



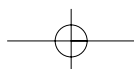
It shows that stock market price indices lost more than 25% in various European stock markets during the 1987 stock market crisis. During 1990 stock market trading, the majority of the world stock market indices declined from 20% to 50%. In addition, during the month of March 2000, the Asia IFC index declined about 44%, other individual stock markets witnessed a decline of more than 60% such as NASDAQ, 24% in Germany, Canada 19%, and London 14% during one-month transactions. During August transactions, the stock markets price indices declined from 10% to 45% in most of the world stock markets.

The high changes of stock market prices are not confined in one direction, rather it goes up and down in an irrational manner during some periods. Table 2 presents the high-low stock exchange price index movements in selected stock markets, including both developed and emerging stock exchanges, during the 1998-year stock transactions. It shows that the percentage between high-low prices of stock indices in the majority of the world stock markets was between

**Table 2.** Stock Exchange Price Index Movements (High-Low Volatility) during 1998.

Exchange	Index	High	Low	% (Change)
Amsterdam	AEX Total Return	845.10	528.10	60.04
Athens	ASE Composite	2.747.55	1.456.15	101.86
Brussels	Belgian All Share	10.472.41	6.804.88	54.92
Helsinki Exchanges	HEX Yield Index	5.719.45	4.220.44	77.60
Italian	Historical MIB	25.647.00	16.515.00	55.40
London	FTSE All Share	2.885.17	2.166.07	44.20
Luxembourg	LUX General	9.064.57	6.666.06	45.97
Madrid	Total	948.45	624.64	51.84
Oslo	OSE Total Index	1.477.11	745.46	87.22
Paris	SBF 250	2.799.74	1.868.71	49.82
Stockholm	SX General	4.871.28	2.467.80	64.50
Swiss Exchange	SPI Index	8.489.00	5.108.40	66.18
Vienna	Wiener Borse Index	648.95	420.14	54.46
Mexico	IFCG Price Index	1981.0	861.1	140.05
Argentina	IFCG Price Index	1849.1	880.7	109.95
Korea	IFCG Price Index	224.1	91.2	145.72
Malaysia	IFCG Price Index	142.5	45.4	214.87
Thailand	IFCG Price Index	228.2	76.4	198.69
Turkey	IFCG Price Index	747.7	260.1	184.62
Egypt	IFCG Price Index	164.2	111.5	47.27
Average				91.04

Source: FESE, European Stock Exchange Statistics, 1998 and IFC, 1999.



44% and 214% during the 1998 year trading. The average percentage of high-low change (lagged) was about 91.04% for the selected sample of the stock exchanges indices during the 1998 stock trading.

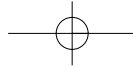
The irrational stock market price movements are spreading to include more developed stock markets. In addition, emerging stock markets become more correlated with developed stock markets during irrational stock market prices movements. Correlation between stock markets tends to increase during unstable and high volatility periods. The market crisis initiated in one stock market may spread out to other stock markets across continents, due to the new situation of closed linkages and interactions among the international stock markets.

However, there is no accepted interpretations or theoretical framework for the above irrational movements of stock prices. No clear or generally accepted models available to explain the irrational behavior of stock markets. On the contrary, the literature is more developed in exploring other financial crises. For example, we may find well-articulated models in interpretation of currency crisis, such as what is known as generation models of currency crises (Ceci, 1999; [Krugman, 1979](#)). In addition, the fundamental factors of stock markets are not well stated as that in bonds trading, since we find interest rate, monetary policy and inflation are the major fundamentals that lead the bond prices.

### 3. EFFICIENCY OF THE STOCK MARKET

The stock prices should respond to fundamentals and real economic data, including dividends distribution, repurchasing of shares announcements, earning per share, earning announcements and forecasting, inflation, employment data, monetary policy and other economic fundamentals. Many studies examined one or more factors that affect stock prices and found positive relations between fundamentals values and movement of stock prices. For example, there is a long list of studies that examined the U.S. stock market responses to announcements of repurchasing and dividends that reported positive signals to stock prices, such as: [Ikenberry et al. \(1995\)](#); [Vafeas and Joy \(1995\)](#); [Lie and McConnell \(1998\)](#); [Comment and Jarrell \(1991\)](#); [Best et al. \(1998\)](#) [Guay and Harford \(2000\)](#); [Jagannathan et al. \(2000\)](#); [Ofar and Thaker \(1987\)](#) [Vermaelen \(1981\)](#). Some of these studies reported that a share repurchase announcement creates a higher positive response than dividends announcement, while other studies reported similar positive signals.

In other markets, various studies reported positive signals of stock prices as a response to announcements of repurchasing and dividends. For example in Japan: [Dhatt et al. \(1994\)](#), in Singapore and Hong Kong: [Chung & Lee \(1998\)](#) in Canada: [Li and McNally \(2000\)](#) and [Ikenberry et al. \(2000\)](#), in U.K.: [Rau](#)



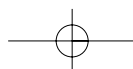
and Vermaelen (2000); Rees (1996) and Stonham (1995), in Australia: Otchere and Ross (2000) in Norway: Skjeltop (2000).

For price earning per share, earning announcements, accounting earnings, financial ratios and forecasting, various studies reported positive effect on stock prices in various stock markets. In U.S. stock market: (Lee, 1996; [Maddala & Nimalendran, 1995](#); [Bandyopadhyay, 1995](#); [Kothari & Zimmerman, 1995](#); [Han & Wild, 2000](#)). In Hong Kong: (Terpstra & Fan, 1993). In Singapore & Hong Kong: (Chung & Lee, 1998). In Japan: ([Chan et al., 1991](#)). The majority of the above studies reported that there was a positive effect of earning information in changing stock market prices. For example, [Chiang et al. \(1997\)](#) found that changes in earning per share are an important factor in changing stock prices. [Maddala and Nimalendran \(1995\)](#) found that earning surprises have significant effect on stock prices. [Bandyopadhyay \(1995\)](#) found that forecasting of earnings explain about 60% of the variation in forecasted stock prices. However, the above studies assumed stock market efficiency, because in some conditions or periods there is either overreaction to earning information, and may lose its ability to predict stock prices (Kalluiki, 2000), or it may be an earning-price anomaly relationship due to the market inefficiency ([Ball, 1992](#)).

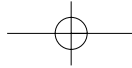
Other studies examined the response of stock prices to other fundamentals, such as book to market value, fair value accounting, size of the firm, and other economic factors: (Fama & French, 1992, 1994; [Chan et al., 1991](#); [Bagella et al., 2000](#); [Cornett et al., 1996](#); [Chui & Wei, 1998](#)). The above studies indicated that the book to market ratio, and size of the firm are important factors in movements of stock market prices. For the effect of other economic data on stock prices, Kwon and Shin (1999) found that Korean stock market price indices reflect macroeconomic variables such as production index, exchange rate, trade balance and money supply. For the unemployment factor, [Boyd et al. \(2001\)](#) found that an announcement of rising unemployment is good news for stocks during economic expansions. [Ely and Robinson \(1997\)](#) reported that stock prices are related to movements of overall consumer price index. The effect of other fundamentals on stock price movements varies with the degree of financial development of the country ([Dellas & Hess, 2001](#)).

#### 4. MODELS OF STOCK MARKET CRISES

There are no clear causes of the stock market inefficiency, a long list of empirical studies reported different causes, many of these studies reported contradicted conclusions as presented below. In addition, there are various opinions among different groups of experts concerning the total elements that maximize the probability of evolving a stock market crisis ([Sabri, 1995a](#)). The







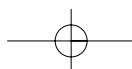
causes of stock market crashes in 1987, 1989, and 1997–1998 are not yet clear, and this is applied even to the 1929 stock market crisis. Many of the mentioned causes of the 1987 crash are related to U.S. market such as introducing a new tax law, increasing the bonds yield and inflation data, but such elements did not exist in other markets which were severely hit by the 1987 crash such as the German stock market (Sabri, 1995b). [Jeng et al. \(1990\)](#) discussed the 1929 stock market crisis, and found that most of stock markets are to be efficient except the U.S. and U.K. stock markets. The stock market crises may be caused by global events, such as those of that 1987 crash, or due to local events such as those occurred in Mexico, the Philippines and India ([Aggarwal et al., 1999](#)), or may be caused by regional events such as those of 1997–1998 in South Asia.

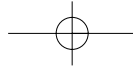
Therefore, this paper intends to formulate models of understanding stock market crises and irrational behavior of stock markets' speculators, during unstable periods of stock trading in both developed and emerging stock markets. This study found that the causes and interpretations of stock market crises reside in various models. The models have been articulated and stated based on the state of the arts of the stock market crises and high price volatility interpretations, and considering the majority of empirical investigations published in the last fifteen years. The models may be classified in various groups as presented in Table 3. However, we tried to classify models and interpretations of stock markets as if there are independent causes, but it should be noted that the suggested models are also interrelated with each other as well as their interpretations.

Accordingly, the following sections of this paper will be devoted to discuss models of stock market situations that may be found during stock market crises and unstable conditions. These models and their interpretations represent the inefficient stock market situations as alternatives to the concept of stock market efficiency.

#### *Overreaction Model*

The most effective argument against efficiency of the stock market that explains the stock market crises and high price volatility during unstable conditions is the overreaction model and noise trading. The overreaction concept is related to the fact that during some periods of stock trading, prices respond to non-fundamentals fully or partially rather than fundamentals. This occurs due to various causes, including: overreaction to adverse information, and noise trading in bad times, overreaction for political factors, overreaction to earning information, overreaction for introducing new laws and regulations, and bursts of stock bubbles accompanied by financial crisis.



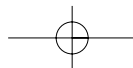


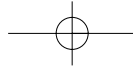
**Table 3.** Models and Interpretations of High Volatility and Stock Markets Crises.

Models	Interpretations
1. Overreaction model: (stock prices response to non-fundamentals fully or partially)	1. Noise trading and adverse information 2. Overreaction for earning announcements 3. Adverse effect of political risk 4. Overreaction to introducing tax laws 5. Bubbles and moral hazard interpretation
2. Inefficiency of related laws.	6. Limitations of basic laws (First Level) 7. Inefficiency of corporate laws (Second Level) 8. Limitations of trading mechanism (Third Level) 9. Reducing of liquidity due to imposing measures of preventing manipulations (Fourth Level) 10. Insufficiency of emergency measures; Price limits (Fifth Level)
3. Increasing linkages model	11. Liberalization of stock markets 12. Volatility of foreign trading and cash flow 13. Affect of cross listed shares
4. Transmission of volatility model	14. High correlation between world stock indices 15. Affect of major markets to other stock markets 16. Transmission due to overnight information 17. Transmission during sharp declining of prices
5. Adverse impact of derivatives	18. Option markets: volatility due to changing option index, interaction with underling shares, and introducing new options 19. Index future and index options: leading cash market and interaction with underling shares
6. Adverse impact of related markets	20. Bonds: changing of bonds yield, volatility in bonds index, interaction with share trading, 21. Interest rates: changing of rates and insufficiency of financing intermediates 22. Currency rate: changing in exchange rates and disadvantages of national currency
7. Impact of volume volatility model	23. Volume volatility leads stock prices volatility
8. Econophysics' model	24. Changes in stock prices follow crowd effect with many agents

#### *Overreaction to Noise Trading*

Several studies found overreaction to noise trading and adverse information in the majority of the world stock markets, in which prices are not justified by fundamentals. For examples, in U.S. stock markets: ([Chopra et al., 1992](#); [Veronesi, 1999](#); [Rozeff & Zaman, 1998](#)), in Spain: ([Alonso & Rubio, 1990](#)),





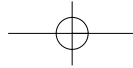
in Brazil: (de Costa, 1994), in New Zealand: (Bowman & Iverson, 1998), in Istanbul: (Kiyamaz, 2001), in Tokyo: (Gunarantne & Yonesawa, 1997), in Pacific countries stock markets: (Ahmed et al., 1999), in East Asian markets: (Ajayi & Mehdian, 1994), in Korea and Japan: (Chung & Lee, 1998), in Hong Kong: (Fung, 1999) and in Taiwan and Korea: (Titman & Wei, 1999).

The noise trading, and overreaction are interchangeable terms that represent irrational trading and produce prices not based on fundamentals. The overreaction of stock markets mainly exists during periods when prices decline, and there is uncertainty in stock trading. Several studies investigated the influence of noise trading and the adverse information effect on stock trading during and after the 1987 crash. Seyhun (1990) reported that the overreaction was an important part of the 1987 crash, and the corporate insiders did not systematically foresee the crash. Black (1986) argues that the “noise trading” makes it very difficult to test either practical or academic theories about the way that financial or economic markets work (Henry, 1998; Koutmos, 1999; Schwert, 1989, 1990; Kane et al., 2000) found that stock market volatility raises more during market declines, market recessions, stock market crashes and after large price changes. Titman and Wei (1999) found that the Taiwanese stock prices may have deviated from their fundamental values during selected times.

Shiller (1981) found out that the stock prices are far more volatile than can be justified based on real economic events. The overreaction and noise trading also create much risk that may reduce the capital stock and consumption of the economy (De Long et al., 1989). This situation makes stock prices overreact to bad news in good times and under react to good news in bad times (Veronesi, 1999). In Korea and Japan, a substantial fraction of stock price movement was found to be related to non-fundamentals elements (Chung & Lee, 1998).

#### *Overreaction to Political Situation*

The political factor may also be considered as one of the causes of overreactions in stock markets and may increase volatility in stock prices. The negative effect of political situation in stock market prices may occur during normal changes as new elections, or sudden changes in the political systems or due to regional developments. Various studies discussed the effect of the political factor in stock market prices, including: Netherlands: Jacobsen et al. (2000), Hong Kong: Chan and Wei (1996), U.S.: Lobo (1999), Greek market: Alexakis and Petrakis (1991), South Africa: Brooks et al. (1997), Trinidad and Tobago: Leon et al. (2000), and in emerging markets: Perotti and Oijen (2001). These studies indicated that political news may increase stock price volatility. For example, Lobo (1999) found that U.S. mid-term election is a



significant source of uncertainty to the stock market. Alexakis and Petrakis (1991) found that the behavior of stock market index is mainly related to social political factors beside investment opportunities. Brooks et al. (1997) reported that the stock market volatility in South Africa behaves like that observed in developed stock markets after political change in 1990. Leon et al. (2000) found that the Trinidad and Tobago stock exchange witnessed high volatility during political unrest up to 1989, while it showed stability in stock prices thereafter.

#### *Overreaction to Earning Announcements*

Overreaction of stock markets are also to be found as responsive to earning announcements and may be explained due to the inefficiency of stock markets as indicated by De Bondt and Thaler (1985, 1987). Bartholdy (1998) found that changes in earnings-price ratio may lead to investor overreaction. However, Zarowin (1989) found that overreaction to earnings is not related to investor reaction, rather to the size effect.

#### *Overreaction to Changes in Tax Laws*

The overreaction in stock markets may be found as a response to introducing and/or changing of tax laws, such as tax transactions, capital gains tax, income tax and other related taxes. Discussing tax bill in American Congress during 1987 was considered as one of the main causes of 1987 stock market crashes. Bolster et al. (1989) indicated that change in the tax code in the U.S. had a powerful effect on trading behavior of the stock market and was significant in January 1987. In the U.K., Green et al. (2000) reported that changes in transaction fees have had a significant effect on share price volatility. Hu (1998) indicated that changes in stock transaction tax in Hong Kong, Japan, Korea, and Taiwan reduced the stock market prices. Similar findings were reported in the Swedish stock market (Umlauf, 1993).

#### *Bubbles Burst and Moral Hazard Interpretation*

One of the interpretations for the sharp falling of stock prices is related to the concept of asset price bubbles. The fall in stock prices may occur in connection with financial crisis, or due to high volatility of stock prices associated with bubbles. Stock bubbles mean overvaluation of stock prices, which existed in various stock markets during some periods such as happened in Nordic countries and Japan during late 1980s and in some of Asian countries around the middle of the 1990s (Goyal & Yamada, 1999). Some believe that bubbles may be related to institutions, and mainly financial institutions, and not to fundamentals (Huang & Xu, 1999).

Various studies examined the existence of bubbles in stock prices ([Chan et al., 1998](#); [Chirinko & Schaller, 1996](#); [Sarno & Taylor, 1999](#); [Ito & Iwaisako, 1995](#), [Raymond, 2001](#); [Futagami & Shibata, 2000](#)). The majority of the studies reported the existence of price bubbles during some periods and in various markets, mainly in Asia. For example, Sarno and Taylor (1999) found stock market bubbles in all East Asian markets except Australia. Ahmad et al. (1999) reported that stock market prices contain elements of speculative bubbles not justified by fundamental data in ten Pacific countries. Other studies suggested that measuring of bubbles may help in predicting stock market prices, to assess the risk of financial crashes, and proposed various models in this regard ([Raymond, 2001](#); [Chirinko & Schaller, 1996](#)).

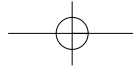
The most recent interpretation of the bubble concept is connected with financial crisis and associated with bad loans, which is known as a moral hazard problem. For example, Sarno and Taylor (1999) found the East Asian crisis was due to stock market bubbles associated with financial intermediaries' problems and reversible capital flow. Goyal and Yamada (1999) found that during the bubble periods, firms with high non-fundamentals' valuations issue more new debt, and thus their cash-flow sensitivity is lower.

#### *Inefficiency of the Related Laws*

The efficiency of related laws for stock trading means more developed, more competitive and more relevant to cope and absorb the stock market crises and extraordinary high price volatility. Various studies conducted in the majority of the world stock markets, examined the existing laws. The majority found inefficiency of various aspects of the related laws, that may increase the possibility of imitating the stock market crises, which support the inefficient model of stock market law environment. The shortages of the related laws may be classified into five levels, as follows:

##### *First Level: Basic Laws*

Various studies questioned why some countries have bigger capital stock markets than others, and concluded that countries with poor oriented laws have smaller and narrower capital markets such as French civil law countries compared to common law countries (La Porta et al., 1997). Levine and Zervos (1998) stated that countries with investor protection laws tend to have better developed stock markets. [Chui et al. \(2001\)](#) found that distinguishing between common law and civil law provide an indicator to whether a market includes a momentum effect prior to financial crises or not. [Johnson et al. \(2000\)](#) and [Alba et al. \(1999\)](#) reported evidence that the weakness of legal institutions

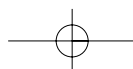
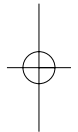
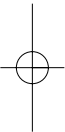


and the poor corporate governance had an important effect on the stock market declines in the Asian crisis in 1997. Carstens and Schwartz (1998) suggested the need for upgrading financial regulatory framework of emerging countries to handle highly volatile capital flow with unanticipated swings. The World Bank report, 2000 argues that further economic progress in emerging markets are related to the adopting of appropriate measures to reduce capital flows volatility, which needs to set the relevant instruments, policies and institutions.

#### *Second Level: Corporate Laws*

The aim of corporate law for stock trading is to maintain the balance between corporate governance, investor protection, and liquidity of the stock market. In addition, there are many aspects of corporate laws which may have a positive or negative effect on stock market liquidity and stability, such as monitoring rules, minority shareholder protection issue, block holding shares rules, repurchases shares rules, and type of shares (bearer to registered; vote to non-vote). Many studies were carried out in the last decade to discuss the issue of corporate governance and stock market activity and liquidity. [Bhide \(1994\)](#) stated that the U.S. stock market concentrated on liquidity rather than corporate control, and concluded that benefits of stock market liquidity must be weighted against the cost of corporate governance. [Becht \(1999\)](#) reported that legal constraints aimed at strengthening minority protection, which might destroy liquidity of corporation and voting power concentration through blocks has a negative effect on liquidity. Shleifer and Vishney (1997) considered the legal protection of investor rights as an essential element of corporate governance.

Classes and features of shares may affect the liquidity and volatility of stock market prices. Different corporate laws have different classes of stock shares, including bearer share compared to registered share, vote share compared to non-vote share. The bearer shares which may be found in the majority of European countries may be traded outside stock exchanges, accordingly may increase volatility of stock prices and may destabilize the market during stock crises periods, based on the opinion of stock market experts (Sabri, 1995a, b). [Gardiol et al. \(1997\)](#) found that the bearer share and ownership transfer regime changes are significant variables in explaining the dual class share price differences. For vote to non-vote stock prices, various studies examined the issue, including: [Zingales \(1994\)](#); [Grossman and Hart \(1988\)](#); and [Megginson \(1990\)](#). The major difference in the case of vote to non-vote shares is related to the reason for holding shares. For non-vote shareholders have no reason to hold large blocks of shares, while shareholders of vote shares may hold them for controlling purposes ([Zingales, 1994](#)). The vote and the non-vote shareholders



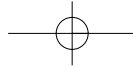
behavior will be significantly different to buy or sell during high price volatility due to the differences between the final interests of shareholders.

*Third Level: The Institutional Features*

Since the 1987 crash, many empirical studies were conducted in various stock markets to investigate the role of institutional features of stock exchanges in stock market crises. This includes trading mechanism, cash settlements, type of orders, trading hours, transactions cost, and computerizing of trading activities. The world stock exchanges using different trading and pricing systems, different settlements cycles ranged from one to seven days, few of the world stock exchanges still use floor-trading systems, while the majority use various models of computerized systems. The question here, is what are the most relevant features for stock trading mechanism, to cope with stock market crises?

Financial experts started to examine whether some of the present institutional features and structure of the stock market is associated with stock market crisis at certain events. Some believe that the 1987 crash might not have been as large as it was if more orderly trade mechanisms had been maintained ([Harris, 1989](#)). However, empirical examinations of institutional features reported contradicted observations regarding the relevance of the existing trading mechanisms to cope with stock market crises. This applies, to the various methods of stock trading: For example, [Madhavan \(1992\)](#) examined the price formation under two trading mechanisms and indicated that a periodic auction trading offers greater price efficiency where a continuous auction trading fails. He suggested switching to the periodic method in times of market stress. [Theissen \(2000\)](#) found that prices in the call and continuous auction markets are more efficient than prices in the dealer markets. [Blume et al. \(1989\)](#) found that there was a strong relation between order imbalances and stock price movements during the 1987 crash. [Amihud and Mendelson \(1991\)](#) found that the periodic clearing at the beginning of the trading day was noisy and inefficient. [Comerton-Forde \(1999\)](#) found that the opening call improved market efficiency and lowering stock volatility at the open comparing to the continuous open. Concerning settlement cycle, there were rumors that the performance of clearinghouses in the U.S. was one of the causes of the 1987 stock market crisis. [Bernanke \(1990\)](#) concluded that the Federal Reserve played a vital role in protecting the integrity of the stock market settlement system during the crash.

Another aspect that may influence the stock market volatility is the computerization of stock exchanges' operations. In the last decade, the majority of the world stock exchanges switched to electronic trading system. Trading of stock markets using full computerized and electronic screen systems may reduce the transaction costs and increase transparency, but may raise the possibility of

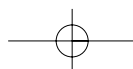
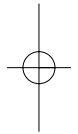
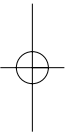


destabilizing stock markets through increasing the high price volatility of stock markets during periods of unstable trading. In some European stock exchanges, the computerized system had been broken down during some severe falling price periods due to the heavily received selling and buying orders. However, the findings of the empirical investigation of this issue is mixed ([Naidu & Rozeff, 1995](#); [Bertero & Mayer, 1990](#); [Brockman & Chung, 1999](#); [Blennerhassett & Bowman, 1998](#); [Ferris et al., 1997](#)). For example, Naidu and Rozeff (1995) found that automation of stock market increases stock price volatility. [Bertero and Mayer \(1990\)](#) indicated that there was no evidence of a relation between the existence of computer trading and the performance of markets during the crash. [Ferris et al. \(1997\)](#) found no evidence to support the contention that automation of trading destabilizes the stock market.

#### *Fourth Level: Controlling Rules of Trading*

The majority of stock markets impose various regulations to prevent manipulations and protect investors; such as safe harbor rules, insider trading rules, investment protection rules and margin requirements. However, such regulations may lead to less liquidity and may lead to sharp declining of stock prices during high volatility situations.

The effect of imposing regulations on insider trading are examined empirically in many stock exchanges and the majority concluded that such rules are not effective, and may have disadvantages related to reducing liquidity and are not justified. The concept of imposing control on insiders trading is to prevent them from getting abnormal profit as compared to outsider traders. However, such regulations may prevent insiders from trading in the stock markets when they are mostly needed during stock prices falling. [Kabir and Vermaelen \(1996\)](#) indicated that the stock market in The Netherlands became less liquid when insiders were not allowed to trade due to imposing new regulations. [Stoll and Whaley \(1999\)](#) stated that the timing procedure for opening stocks on the NYSE appears to affect price volatility. [Mahoney \(1999\)](#) criticized the Securities Exchange Act of 1944, which aimed to prevent manipulation in the stock market, and claims that the motivation for imposing that act is to increase the political control over NYSE. Similar findings were reported related to the imposing of section 16b by the SEC. [Garfinkel \(1997\)](#) found that the threats of legal sanctions affect the trading behavior of insiders in the stock market. [Lin and Howe \(1990\)](#) suggest that insiders closer to the firm trade are more valuable than insiders removed. [Persons \(1997\)](#) found that there is a negative effect of SEC's insider trade enforcement on target firms' stock value. Accordingly, many experts questioning the wisdom of imposing such regulations, entrepreneurs, and society may disagree on the conditions of imposing





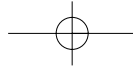
the insider trading restrictions and prefer to allow insider trading, even when it is not socially optimal (Khanna & Bradley, 1994).

*Fifth Level: Controlling Rules of Prices*

There are mixed affects of the stated measures to deal with emergency situations and to help in managing stock price volatility: The world stock markets use different measures to control the price volatility, including price limits of ups and downs in changes of stock prices from prior day, margin requirements and circuit breakers. The aim of imposing such regulations is to freeze or stop stock trading when high-low price movements reach a stated level in one trading day. The governor of the stock exchange may interfere to regulate the manner, and monitor the price situation. Today most of the European stock exchanges and many of the emerging stock exchanges regulate the prevented measures using different ways and high-low levels. Many of the world stock exchanges introduced such regulations after 1987 crash. Some believe that such measures are workable. For example, Bertero and Mayer's (1990) study concerning the stock market structure about the 1987 crash indicated that circuit breakers might have moderated the speed of the crash in some markets. Other stock exchanges are reviewing these measures continuously; for example, the SEC of U.S. established new circuit breaker rule sets of 10%, 20%, 40% of one-day decline in the Dow Jones and modifying the market-wide trading halt (SEC, 1999).

However, the question arises whether these preventive measures are sufficient to deal with emergency in stock market trading. Various studies reported that such preventive measures are not sufficient or not efficient, and they only delay the rational price movements. For example, [Chen \(1994\)](#) examined the price limits regulations in Taiwan and reported that price limits do not have a significant impact on reducing price volatility. [Kupiec \(1998\)](#) found that margin requirements cannot be used to manage market volatility, but they may reduce the open interest of future contracts. [Kim \(2001\)](#) found that when price limits are made more restrictive, stock market volatility is not lower. Kim and Limaphayom (2000) found that high trading volume stocks hit price limits more frequently than lower trading volume stocks. In addition, some studies reported that price limits and margin requirements might create volatility rather than reduce it. For example: Lee and [Yoo \(1994\)](#) examined the effects of margin requirements on stock market volatility and found no evidence that margins affect volatility in the long-run. Hsu (1996) found that the speculative stocks are affected more by margin requirements.

The inefficiency of price limits imposed in the majority of the world stock exchanges is now under debates. Such measures may be sufficient to deal with low or average stock volatility, but it may be difficult to cope with high price



volatility or stock crises. This may be due to the trading outside stock exchanges, especially for countries, which have bearer shares that are not controllable. However, such conclusions may not be examined empirically due to the lack of the valid data related to the size of outside exchange trading during the stable and instable periods.

#### *Increasing Linkages Model*

The third model of stock market inefficiency is related to increasing linkages between the world stock markets linkages. The increasing linkages may create negative aspects of stock market, due to the concept that increasing linkages reduce stock market segmentation, but not enough to create an efficient integrated stock market. This situation may be considered as a major cause for a stock market crisis. The following section aims to discuss the various interpretations for this model.

#### *Liberalization of the Stock Market*

The liberalization of the stock market is one of the major reasons for creating close relationships between the world stock exchanges. The liberalization of the world stock market may reduce the cost of trading and increasing liquidity, but may be considered as a major reason for financial crises, increasing price volatility and stock market crisis, such as occurred in the South Asian stock markets. The liberalization of emerging stock countries has been under strong debate since the 1997 stock market crisis in Asia.

Various empirical studies examined the effect of stock market liberalization on the local stock market volatility ([Bekaert & Harvey, 1997](#); [Levine & Zervos, 1998](#); [Jomo, 1998](#); [Singh & Weisse, 1998](#); [Lauridsen, 1998](#); [Henry, 2000](#); [Singh, 1997](#); [Bekaert & Harvey, 2000](#)). The majority of these studies reported that stock markets became more volatile, due to liberal regulations that increases the volatility spillovers among stock markets, and could harm the economies of emerging countries. For example, Levine and Zervos (1998) found that stock markets became more volatile as a result of stock markets liberalization of 16 emerging stock markets. Jomo (1998) found that the Malaysian financial crisis was due to financial liberalization rather than excessive regulation. Lauridsen (1998) found that financial liberalization contributed to the meltdown of financial crisis in Thailand. [Kim and Rogers \(1995\)](#) found that the stock volatility spillovers have increased since the liberalization of the Korean stock exchange. Singh and Weisse (1998) concluded that the liberalization of stock market is unlikely to help developing countries because of the share price volatility. Cha

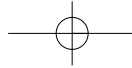
and Oh (2000) found that an emerging market's sensitivity to shocks from developed markets was related to its degree of openness. Bekaert and Harvey (1997) reported that capital market liberalization increases the relation between local market returns and the world market. Bekaert and Harvey (2000) found a small increase in the volatility of stock returns following capital market liberalization.

#### *Volatility of Foreign Trading and Capital Flow*

The effect of foreign trading in stock markets and the volatility of cash flow to equity markets are now considered as major causes of the last stock market crash (1997–1998). There is a general perception that foreign speculators are the first to withdraw from the stock markets during unstable conditions. The published data of equity flows during 1997 and 1998 supported this argument. For example, the capital outflow of equities from the Asian stock markets as a response to the financial crisis, during the years 1998 and 1999 were 24.5 billion as well as decreasing of inflow to other regions (IMF, 2000). Accordingly, foreign investors were to be blamed for the Asian financial crisis (Choe et al., 1999).

The irreversible flows of funds from equity markets decreased the liquidity in stock market significantly, and thus led to the stock market crisis. The issue of foreign investments has become more significant as long as the foreign share of stock trading is increasing in the majority of the world stock exchanges. In some of the stock exchanges, the ratio of foreign trade value of stock transactions exceeded the value of the domestic transactions such as the London Stock Exchange. Increasing equity portfolio flows to emerging countries may be considered as a negative aspect, and may lead to destabilizing the emerging stock markets.

Various studies blamed the foreign speculators and the free flow of equity investments for the instability of stock markets in emerging countries. For example, [Froot et al. \(2001\)](#) found that there is sensitivity of local stock prices to foreign fund inflows, which is positive and large. Accordingly, there is serious criticism against the foreign portfolio capital flow, as a short-term rather than long-term investment. Sarno and [Taylor \(1999\)](#) found that the sudden actual or reversal portfolio flows might have played an important part in the East Asian crisis. The World Bank (2000) stated that continued high volatility and frequent crises as in the 1990s might accompany the increasing of capital flows. [Choe et al. \(1999\)](#) found that positive feedback trading by foreign investors mostly disappeared during the Korean crisis period. De Grauwe (2000) argues for the need to control the capital flow to shield domestic financial markets. Carstens and Schwartz, (1998) argues that foreign capital flows can be



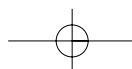
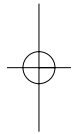
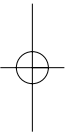
associated with the undesirable dynamic of markets. Singh and Weisse (1998) argues that there is some serious criticism against the portfolio capital flow, as a short-term rather than long term investment, and it may lead to various problems such as: economic and financial crises, undermining the existing bank and financial systems, and increase volatility. [Grabel \(1996\)](#) suggested that the existing high volatility of equity portfolio flows between stock markets created unstable linkages.

#### *Impact of Cross listing*

The practice of cross listing is the most significant phenomena that create linkages among stock exchanges. The idea of cross listing is that a listed firm on a domestic exchange is looking for second or more national or international stock exchanges to be listed there at the same time. The majority of firms listed in the second stock exchange meet the same requirements of stock exchange regulations, while other firms which may not meet the stated requirements of listing use the so-called depository receipts. Cross listing of companies in various stock markets may offer an opportunity to diversify their investments, by investing in different markets, and increasing financial and economic ties ([Sabri, 2002](#)), and may raise new equity capital, creating a positive change in shareholder wealth, increasing stock value and share price, lowering cost of capital, increasing the investor base of the firm and increasing investor recognition ([Doukas & Switzer, 2000](#); [Miller, 1999](#); [Domowitz et al., 1998](#); [Kadle & McConnell, 1994](#); [McConnell et al., 1996](#)). However, on the other side increasing of dual listed firms may increase inefficiency of the stock market. The dual listed firms are priced in different market places, with different currencies, different methods of pricing, different methods of settlements and other related conditions, which may increase the movement of stock price volatility. Accordingly, the question arises here, to whether the dual listed firms have an adverse effect on the price volatility of underling shares. [Froot and Dabora \(1999\)](#) found that the price of twin stocks is highly correlated with the relative stock market indices of the exchanges where the twins' shares are most traded.

Various studies examined the impact of cross listings of firms on the volatility of underling stock prices: ([Jayaraman et al., 1994](#); [Karolyi, 1998](#); [Lau et al., 1994](#); [Werner & Kleidon, 1996](#); [Chan et al., 1996a](#); [Hargis, 2000](#); [Froot & Dabora, 1999](#); [Martell et al., 1999](#); [Domowitz et al., 1998](#)). The findings of the empirical investigations related to the effect of dual listings on the volatility of underling stocks are varied and may differ across stocks depending on the inter-market information linkages ([Martell et al., 1999](#); and [Domowitz et al., 1998](#)).

However, the majority of these studies indicated that the cross listing of firms may increase price volatility. For example, [Hargis, \(2000\)](#) and [Domowitz et al.](#)



(1998) found that the high price volatility might come from reducing the domestic market liquidity. Jayaraman et al. (1994) concluded that the cross listing of foreign firms in the U.S. market is associated with an increase in the return volatiles, because of creating new trading opportunities. [Chan et al. \(2000\)](#) found that the local price movement in the NYSE is positively related to price volatility of cross-listed foreign stocks, and this relation is stronger at the open and weaker afterwards. Ramchand and Susmel (1998) found that volatility of quote prices for the underlying stock increases significantly when New York starts trading ADR.

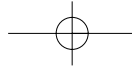
In addition, it should be noted that the effect of cross listing on the volatility of stock prices during instable conditions are not yet examined. The majority of empirical tests reported that there were positive response in stock prices during normal stock trading, but they did not examine the effect during stock market crises during the period of high volatility of stock prices. The increasing size of dual cross listings firms and transactions may become more risky on stock market stability considering the other interpretations of stock crises such as the spillover of volatility, the high correlation between stock price indices and other overreaction interpretations.

#### *Transmission of the Stock Market Volatility Model*

The transmission of stock volatility concept is considered as one of the major factors that spread the stock market crisis and high volatility to other markets. The spill-out of stock volatility exists between the world stock exchanges, within regions' stock markets, and among various pairs' and twins' markets. The transmission of volatility increases (decreases) during high (low) fluctuation of prices, and the mechanism of volatility transmission varies overtime. The degree of transmission of volatility varies from period to another, and from one market or region to others. Aspects of this model may be found in the following interpretations: First, during the stock market crises periods, the world stock indices become so integrated and stock price movements moved so closed, and retained independence during normal situations. Second: There are some leading stock markets, which have significant impact on the majority of the world stock markets. Third: spillover of volatility may occur during overlapping hours of trading as well as from closing to opening trading.

#### *High Correlation Between Stock Indices*

The high correlation between the world stock markets is considered as one of the most risky environments, especially during the periods of high volatility and sharp falling of prices. Sabri (1995a, b) found that the fall of international

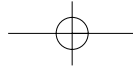


indices is the most risky element in destabilizing of local stock markets as perceived by the stock market experts. Various empirical studies investigated the correlation between the world stock market indices during different times, using various models. Some studies examined the existing correlation between two or more stock exchanges' indices, while other studies examined the correlations between regions, as well as others that covered developed and emerging stock exchanges.

The majority of these empirical investigations reported that there were extreme correlations between the world stock indices. The high correlation of stock prices exists between the developed stock indices, the emerging stock indices, among many pairs of stock markets, and between both developed, and emerging stock indices. The ties of the stock markets indices have increased significantly after 1987 crash, and 1997 crash. The correlation among stock market indices is intensified during the instable periods, while they go independently during stable periods of stock trading.

For example, Ball and Torous (2000); [Solnik et al. \(1996\)](#); Bracker and Koch (1999) found that correlation across a number of international stock market indices tend to increase when world markets are more volatile and/or falling. [Wu and Su \(1998\)](#) found that there are significant dynamic relations among four major international stock markets, and have strengthened considerably after 1987 and they have become higher in recent years. [Hilliard \(1979\)](#) concluded that to the extent that they are related, most inter-continental prices move simultaneously. Sabri (2001a) found that a significant correlation was found between 48 stock market pairs in 1994, and increased to 117 stock market pairs in 1998. Hirayama and [Tsutsui \(1998\)](#) indicated that large changes in indices of U.S., U.K., Germany and Japan have a significant affect on each other's indices, but not in the case of small changes. Gastineau et al. (1994) found that the correlations between developed stock markets (U.S., France, U.K., Japan, German, Switzerland, Canada and Australia) are high and positive, which may reduce the benefit of diversification.

Longin and Solink (2001) found that the correlation between the international equity markets increases in bear markets, and not in bull markets. [Bertero and Mayer \(1990\)](#) found that the high correlations between markets have persisted since the 1987 crash. ([Koutmos, 1997](#)) found that all stock prices indices have a unit root in their univariate representation. Ramchand and [Susmel \(1998\)](#) found that foreign markets become more highly correlated with the U.S. market. [Cha and Oh \(2000\)](#) found that the U.S. influence on the stock markets of Korea and Taiwan has increased sharply since the 1997 crisis. [Koutmos \(1995\)](#) found that the linkages and interactions between NY, Tokyo, and London stock markets have been increased substantially after the 1987 crash era.



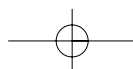
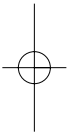
Bracker and Koch (1999) reported that the matrix of correlations across international equity markets changing over time, Koutmos (1996) found that current stock prices in France are correlated with past stock prices in Germany and the U.K. Jeong (1999) found that a domestic market is affected by the volatility surprises of its own market as well as by other foreign markets.

#### *Transmission of Intraday Volatility*

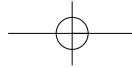
Various studies discussed the phenomena of transmission of volatility across markets and the dynamic interactions between stock price co-movements, due to flow of daily information. The studies covered the transmission during overnight to opening trading (sequential trading) as well as during overlapping trading hours. The majority of the studies found that stock market volatility interactions exist, reciprocal and transmitted from one market to other markets.

The features' stock market volatility spillover may be summarized by the findings of the empirical investigations. For example, [Schwert \(1990\)](#) found that the stock volatility jumped dramatically during and after the 1987 stock crash. Kane et al. (2000) found that volatility generally rises after large price changes, but usually revert to pre-jump level within a week or two. [Chu et al. \(1996\)](#) found that stock returns may be materialized in six regimes with different volatility, and volatility is higher in negative return regimes than in positive return. [Koutmos \(1996\)](#) found that the volatility interactions are extensive and reciprocal, and negative innovation in one market increase volatility in other markets. [Chan et al. \(2000\)](#) found that intraday price volatility is higher at the open and lower at midday. De Santis and Imrohorglu (1997) found that the level of volatility in emerging markets is higher than that of developed market. [Choudhry \(1996\)](#) found volatility with different degrees before and after 1987 in emerging stock markets. Ajayi and Mehdian (1994) found that major surprises in Asian stock markets are followed by increased volatility. Flow of information affects the price movements in next daytime price movements ([Lin et al., 1994](#); [Werner & Kleidon, 1996](#); [Koutmos, 1996](#)). [Ramchand and Susmel \(1998\)](#) Found that there is evidence that morning volatility originating in New York spillovers to the London market. Bracker et al. (1999) found that the co-movement for a given pair of stock markets varies over time.

Many empirical studies examined the spillover of volatility between stock market pairs' indices (Sweden, Norway and Finland: [Knif & Pynnonen, 1999](#); Korea, Japan, U.S.: [Kim & Rogers, 1995](#); Australia and New Zealand: [Brailsford, 1996](#); U.K. and U.S.: [Kofman & Martens, 1997](#); U.S., Canada and U.K.: [Jeong, 1999](#); U.S. and Mexico: [Soydemir, 2000](#)). They reported that,







there is a significant link, and volatility spillovers exist. The volatility surprises of those pairs have an impact on each other, and volatility surprises of each national market are clearly transmitted to others.

Other studies found the volatility spillovers within regional or world stock markets: (Europe: Kanas, 1998; Asian-Pacific: Pan et al., 1999; Latin American: Christofi & Pericli). The majority of these studies found that strong volatility spillover exists within regions. For example, Christofi and Pericli (1999) found the Latin American stock markets exhibit stronger volatility spillovers than other regions in the world. Kanas (1998) found the reciprocal stock price volatility spillovers exist between Frankfurt and Paris and between Paris and London, and London became more influential. Chunchi and Yong-Chern (1998) found that significant dynamic relations exist among four major international stock markets, and these relations have been strengthened after 1987.

#### *Impact of Leading Stock Markets*

There are three world leading stock markets – U.S., Japan, and London – which have an influence on the world stock markets as found by various studies. In addition, there are some leading stock markets, which may have an influence within their regions or related twins. Many empirical studies (Masih & Masih, 1999; Janakiramana & Lamba, 1998; Arshanapalli & Doukas, 1993; Arshanapalli et al., 1995; Wu & Su, 1998; Li & Schadt, 1995; Janakiraman & Lamba, 1998; Kinf & Pynnonen, 1999) reported that the U.S. stock market has a significant influence on other markets and not vice versa. Its influence became greater after the 1987 crash period. A few other studies reported that Japan might have some influence on other markets.

For example: Janakiraman and Lamba (1998) found that the U.S. market affects all other Australian markets except Indonesia, and not vice versa. Kearney, (2000) found that the world stock market volatility is caused mainly by Japanese and U.S. stock markets and transmitted to European stock markets. John et al. (1995) found that short-term volatility and price changes spill over from developed to emerging markets, but not vice versa, the Tokyo market has less influence than that in New York. Kinf and Pynnonen (1999) found that U.S. price changes have an impact on all other markets during the following day. Wu and Su (1998) found that the Japanese market has a strong influence on other markets after U.S. Arshanapalli and Doukas (1993) found that the U.S. stock market had a considerable impact on the France, German, and U.K. in the post crash period. Becker et al. (1990) found the Japanese market has a small impact on the U.S. market.



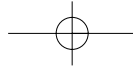
*Adverse Impact of Derivatives Model*

The adverse impact of derivatives on the volatility of underlying stock prices may be considered as one of the major causes of increasing price volatility, assuming those derivatives' prices leading underlying prices. The derivatives include stock options and futures, equity index option market, and equity index future market. They have been introduced recently based on the underlying stocks and traded in some of the developed countries. The options market started in the seventies and mainly located in developed states including U.S., Germany, Zurich, Brazil, Australia, Italy, U.K., Japan, Canada, Hong Kong, Belgium, and Norway. The equity index options and equity index futures are new instruments being introduced in the eighties. The above markets are located in limited developed stock exchanges. The share of the U.S. (CBOE, AMEX, PSE, and PHLX) trading in the stock derivatives is about 75% of the world market value in 1999 (IFSE database, 2001). Accordingly, the impact of derivatives volatility is confined only in about 15 developed stock exchanges and South Korea.

*Impact of Option Markets*

The impact of option markets on the volatility of underlying stock prices may come due to changing in option share index; interaction with underlying shares, and introducing new options in the related stock market. Several reports accused the option market to be the reason for the high stock price movements in the major stock international markets. For example, an official inquiry committee in Amsterdam stock exchange discussed to what extent do buy and sell transactions in Dutch option market determine price development on the Amsterdam Stock Exchange. The report stated that there was evidence that some of the options' series did have the effect of increasing volatility, but it is very difficult to conclude that the prices' peaks are determined purely by option volumes (Stock Exchange Association & EOE, 1990).

Bates (1991) reported that because of examining the option transactions' prices before the 1987 crash, the crash was expected, but didn't have crash fears during the two months preceding the crash. Biais and Hillion (1994) reported that the introduction of the option has confusing consequences on the information efficiency of the market. Kamphuis et al. (1989) argues that the breakdown between the pricing of the future contracts and stock index is considered as one of the main causes of the 1987 crashes. However, some studies reported that introducing new options do not significantly affect stock market volatility, and may increase stock prices (Mendenhall & Fehrs, 1999 Cao, 1999), and may have stabilized the underlying stock market (Bollen, 1998) and (Hwang & Satchell, 2000).

*Impact of Index Option and Future Markets*

The world trading of equity index futures are located in USA, eight European states, Japan, Singapore, Hong Kong, and South Korea. CME of USA conducts the majority of the world trading with a value of 14,150,478 million in 1999 (IFSE, 2001). The significant effect of index future and index equity markets on the underling of stock prices was examined by various studies: ([Chan, 1992](#); [Chan et al., 1991](#); [Chang et al., 1999](#); [Bates, 2000](#); [Lee & Ohk, 1992](#); [Yadav & Pope, 1990](#); [Kumar et al., 1995](#)). The majority of the above studies indicated that future markets lead cash market, and stock market volatility increased after introducing index equity future trading. Other studies found little effect on the stock price volatility ([Dennis & Sim, 1999](#); [Grossman, 1988](#)).

Sourescu (2000) found that there was a negative abnormal return due to introduction of index options that may expedite the dissemination of negative information. [Chan \(1992\)](#) found that when more stocks move together, the futures leads the cash index to a greater degree and futures' market is the main source of market wide information. [Kumar et al. \(1995\)](#) found that, volatility, and bid-ask spreads decline for the stocks contained in the Nikkei 225 Index after the listing of the index options. [Chang et al. \(1999\)](#) found that stocks volatility increased compared with average volatility when Nikkei futures began trading on the Osaka Securities Exchange. [Chan et al. \(1990\)](#) found that price innovations that originate in stock or futures market can predict the future volatility in other markets.

*Adverse Impact of Related Markets' Model*

There are related markets to stock trading, which may have a significant effect on stock price volatility. Due to the fact, that such markets form alternatives for stock investments, and investments in stock markets may be transferred to bonds, currencies' trading or deposits and vice versa in short times. These markets include bonds' market, money markets, and short-term deposits. Accordingly, changes in bond yields, currency exchange rates, and interest rates may have significant influences on stock market volatility.

*Impact of Bond Trading*

The increasing size of volume in bond trading is limited compared to the size of the stock market. The market value of bonds increased by 150% from 1990 to 1999, compared to four times for the same period in the world stock market value. Bonds' trading was found in almost fifty security exchanges, but the majority of trading is mainly located in ten exchanges, including: Tokyo, Osaka, Luxembourg, NYSE, Deutsche, London, Paris, Amsterdam, Copenhagen, and

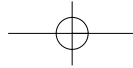
Zurich. One third of the world trading in bonds is located in Japan (IFC, 2000; IFSE, 2001).

The effect of bond trading on the volatility of stock prices is due to changing of bonds' yield, and interaction with share trading. The market of bonds is a strong alternative to investments in stocks; accordingly, the improvement of bond yield may shift investments and liquidity from stock markets to bonds' markets. This interpretation was one of the causes of the 1987 stock crises. Changing of bonds' yields may increase high stock price volatility. For example the bond yield (over 10 years) changed during one year (end year of 1998 to end year of 1999) from 4.65% to 6.28% in U.S., in Argentina from 5.11% to 9.07%, in Brazil from 26.66% to 21.18%, in Belgium from 4.94% to 5.46%, in France from 4.44% to 4.84%, in Netherlands from 4.89% to 5.15%, in U.K. from 4.45% to 4.41% and in Australia from 5.01% to 6.97% (IFSE, 2001).

Various empirical studies examined the relationship between stock and bond markets: (Goh & Ederington, 1999; Fleming et al., 1998; Lim et al., 1998; Dimson & Hanke, 2000; Remolona, 1991; Shiller & Beltratti, 1992; Solnik et al., 1996). The majority of these studies found that there are strong interactions and linkages between the bond markets and stock markets, and that the stock market overreacts to bond yield and rating. For example, Fleming et al. (1998) found that the volatility linkages between stock, bond, and money markets are strong, and even became stronger since the 1987 stock crash. Theodore (1999) found that the 1987 crash changed the stock-bond interaction from a symbiotic to a predator-prey relationship. Goh and Ederington, (1999) found that equity market reacts to changing in bond rating. Lim et al. (1998) examined the interrelationships between international bonds and international stock markets and found that bi-directional causality exists between both return markets.

#### *Impact of Exchange Rate*

The effect of the exchange rate and the money market on stock market volatility has received much attention lately, especially after the 1997 financial crisis. The devaluation of local currencies, the high short-term external debts and high interest rates and financial imbalances were the major causes of financial crises of 1997 in the Asian region as reported by: Kamin (1999); Kwack (2000); and Mishkin (1999). Other studies discussed the direct impact of exchange rate volatility on the stock price volatility: (Bodart & Reding, 1999; Griffin & Stulz, 2001; Phylaktis & Ravazzolo, 2000; Kearney, 1998). The majority of the above empirical studies indicated that the volatility of the exchange rate has significant influence on stock market volatility. For example, Bodart and Reding (1999) show that an increase in exchange rate volatility is accompanied by a



decline in international correlation between bonds and to a lesser extent, the stock market. Kearney (1998) found that exchange rate volatility is a more significant determinant of volatility of stock market than interest rate volatility. Phylaktis and Ravazzolo (2000) discussed the stock prices and exchange rate dynamics and found that the U.S. stock market acts as a conduit through the foreign exchange market and local stock markets are linked. Griffin and Stulz (2001) found that exchange rate shocks are important for the stock returns of industries that produce international goods.

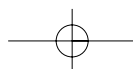
#### *Changing in Interest Rate*

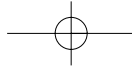
Other studies found a direct impact of changing interest rate and money market on stock market volatility. For example, Kearney and Daly 1998 found that the volatility of the Australian stock market depends on the volatility of inflation and interest rate directly and volatility of money supply indirectly. Koch and Saporoschenko (2001) found that the stock returns of keiretsu financial firms have negative responses to interest rate increases. Kaen et al. (1997) found that increases in official discount rates are associated with negative abnormal returns on German equities and decreases of official interest rate lead to positive stock market wide returns. Fleming et al. (1998) found that the volatility linkages between the stock market, and money market are strong.

#### *Volume Volatility Model*

The concept of volume volatility model is based on the concept that changing prices need volume to move, and it works based on the interpretation that trading of stock market as expressed by volume and size of transactions dissemination information in the stock market, thus receive reactions from speculators. Accordingly, the high volatility of stock prices and crises may be created as a consequence of volume volatility and trading activities. Various studies reported that volume leads stock prices changes and found significant relationships between volume and stock volatility, and that trading volume is a source of risk due to flow of information ([Chordia et al., 2001](#); [Chan et al., 2000](#); [Kramer, 1999](#); [Saatcciglu & Starks, 1998](#); [Jones et al., 1994](#); [Jayaraman et al., 1994](#); [Gallant et al., 1992](#); [Admati & Pfleiderer, 1988](#); [Blume et al., 1989](#); [Karpoff, 1987](#); [Gervais et al., 2001](#)).

For example: [Saatcciglu and Starks \(1998\)](#) found that volume leads to stock price changes in four out of six emerging stock markets. [Gallant et al. \(1992\)](#) found that there are positive correlations between conditional volatility and volume and large price movements are followed by high volume. [Blume et al. \(1989\)](#) stated that a portion of the losses on S & P stocks in [October, 1987](#)



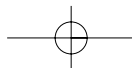
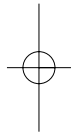
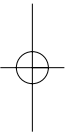


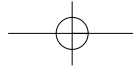
was related to the magnitude of the trading volume, and not to real economic factors. Chan et al. (2000) found that trading volume for foreign stocks is strongly associated with NYSE opening price volatility. Safvenblad (2000) found that Swedish index returns exhibit high autocorrelation, when trading volume is low. However, Jones et al. (1994) found that the positive volatility-volume relation documented by numerous researchers reflects the positive relation between volatility and number of transactions. Gervais et al. (2001) found a high-volume return premium exists in stock prices, and reported that individual stocks whose trading was extraordinary large over period of weeks tend to experience large returns over the coming months.

#### *Econophysics Model*

In the last decade, many statistical physicists introduced new interpretations for the causes of stock market crashes. Their concept is based on statistical physics of financial time series, known as the econophysics interpretation of the causes of stock crises. It is based on the following interpretations: Stock crashes of 1929, 1987, and 1997 have the same origins that are found in the collective crowd behavior of the market traders leading to a critical point ([Sornette, & Johansen 1997, 1998](#)). The stock market crises are analogous to critical points in statistical physics and assumed that market price movements follow power-law distributions ([Plerou et al., 2000](#); [Stauffer & Sornette, 1999](#); [Sato & Takayasu, 1998](#)). The stock volatility correlations are power laws with a non-unique scaling exponent ([Pasquini & Serva, 1999](#)). Stock market crises are related to the existence (or not) of long, medium, short-range power-law correlations in the financial cycles ([Ausloos et al., 1999](#); [Ausloos, 2000](#)). Large variations of stock prices are due to a crowd effect where many interacting agents imitate each other's behavior ([Bak et al., 1997](#); [Paljgyi & Mantegna, 1999](#)). When interactions among traders become stronger and reach some critical values, a second phase transition and bull and bear market may be observed, and the phase transition from a bull market phase to a bear market is considered as the stock market crash ([Kaizoji, 2000](#)). The stock market becomes highly ordered at crashes, but gradually loses this order during static periods ([Poniza & Aizawa, 2000](#)). Stock price fluctuations occur in all magnitudes in analogy to earthquakes with eight different orders of magnitude ([Gopikrishnan et al., 2000](#)).

The above empirical studies conducted in various stock markets, reported similar conclusions. However, the above concepts and the stated interpretations do not help in predicting future crises or in suggesting policies for avoiding and reducing the possibility of evolving future stock crashes.





## 5. POSSIBLE REMEDIES

To consider the above causes, various reforms of the stock market regulations and solutions may be suggested in order to curb the possible causes of stock market instability. This means that as long as the concept of stock market efficiency is impaired fully or partially during certain periods of the world stock trading, remedies are urgently needed in order to sustain the efficiency of stock markets and to keep stocks trading as rational as possible. This section is devoted to address this issue by presenting suggestions, which need to be tested empirically in further studies.

### *Reform of Bearer Share*

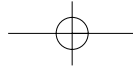
Most of the European corporation laws permit bearer share certificates, which means no control over the share trading of the listed securities outside the stock exchanges as long as it requires only handling certificates. In addition, many stock exchanges permit the trading of the listed firms to be conducted in and outside exchanges. Observers recognize that the volume of the outside trading for the listed shares may be estimated as many times of the trading size conducted in inside stock exchanges. This situation creates various share prices beside the exchange stock prices, and may increase the overreaction of stock traders and noise trading in certain events. The bearer share certificate and stock trading outside the stock exchanges make the job of controlling stock market unmanageable, in case of crisis. Therefore, the effect of stock trading outside stock exchanges should be examined thoroughly to confine the stock trading for the listed firms to trading inside exchanges. Accordingly, there is a need to change the related corporation laws to replace the bearer share certificate by the registered certificate.

### *Reviewing Price Limits*

Many of the international stock markets started to apply regulations related to freeze or stop stock trading when high-low price movements reach a stated level in one trading day. As indicated in previous section, the interference of the stock exchanges governor to regulate, and monitor the price situation should be examined carefully, especially during falling and high volatility periods. For example, the SEC of the U.S. modified the market wide trading halts of extraordinary stock market price volatility, to make it more flexible (SEC, 1998).

### *Harmonization of Institutional Features*

There are various mechanisms used in the world stock exchanges, including: methods of determining the stock price quotations on trading day, methods of



trading and stock auctions, qualifications and tasks of exchange members including specialists, brokers, and dealers, methods of stock trading orders. It is obvious that some methods may function positively during stock market crises than other methods of trading operations. However, there is a need for intensive studies to test the influence of such methods on stock price volatility, in order to exclude the methods that might have a negative effect on stock price stability. Such issues should be as to separate the function of stating stock prices from executing orders, to prevent brokers and dealers who bring stock orders and conclude deals from trading for their own account, and to use the single standard price method instead of continuous price auction in crisis times.

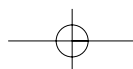
#### *Relaxing of Share Repurchases Laws*

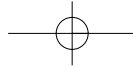
During the stock market crises and sharp falling of stock prices, there is a need to increase liquidity in the market. This may be realized by interfering the company to buy its own shares, and to hold them in the treasury until market recovery. This is prohibited in all of the world stock markets, with the exception of the U.S., which recently issued a new rule in this regard. It stated that “events following the market breaks in October 1987 and October 1997 have underscored the significant role of issuer repurchases during market downturns and the need for clarity as the applicability of Rule 10b-18 in periods of extreme downturns. On those occasions issuer repurchases provided an important source of liquidity that helped ease market stress” (SEC, 1999).

Thus, there is a need to consider the firm interference in the stock market to buy its' own shares if the share prices fall to a certain level, and the repurchased shares may be held as long as the market situation requires so. In a study (Sabri, 2001b) covering a sample of thirty-six countries representing both developed and emerging markets, found that there is an increasing movement in the world stock market towards adopting or deregulating the share repurchases activities, and there are more positive changes related to using corporate share repurchases in enhancing the stock market during stock crises. However, this is still limited and working under conditions that may not deal with stock market crisis.

## **6. SUMMARY AND CONCLUSION**

This paper is intended to present and articulate the causes and interpretations of instability of stock markets as exist in practice as well as in state of arts. In order to suggest models, which are reflected in the frequent stock market crises and extraordinary high price volatility. The world stock markets witnessed various major significant changes in the last two decades that create the need





to examine carefully the issue of stock market instability and to synthesize coherent alternatives for the concept of efficiency in the stock market. Thus, this study examined this issue and found that the causes and interpretation of stock market crises reside in various models, as an alternative for the efficiency of stock market including: Overreaction model, adverse impact of related laws model, increasing linkages model, transmission of volatility model, adverse impact of derivatives model, adverse impact of related markets model, effect of volume volatility model, and econophysics' interpretation of stock crises.

Based on the presented findings, this study draws the following conclusions: In normal situation stock prices reflect fundamentals data including: announcements of dividends, repurchases of their own shares, price earning ratio, book to market ratio, size of the firm, return on equity, inflation rate, and other economic factors. On the other side, the overreaction, bubbles, and noise trading exist in the majority of the world stock markets, and in some of the emerging stock markets during unstable periods. The correlations and integration between the world stock markets are increasing since the 1987 stock crash. The stock markets became closer to each other. The correlation between stock markets indices increased significantly since the 1987 crash, during high volatility and declining prices periods. Otherwise, they are moving separately based on their own respective fundamentals. Thus, transmission of high volatility of stock prices and stock crashes from one market to another, mainly exists, and materializes significantly during periods of sharp falling, and high volatility of stock prices.

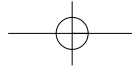
In transmission of volatility, three major developed stock markets have a significant effect on other stock markets. Mainly U.S., Japan, and London. If we consider the fact that the economic fundamentals and stock trading mechanism and regulations are different from one stock market to another, it is expected that the consequences of stock market crashes will be varied. The different bases of laws and trading mechanism may explain, the different effect of stock market crises on the world stock markets, including the period for recovery, and come back to the same level of prices before the crash.

Empirical investigations for causes of stock market crises, and features of high price volatility raise more questions rather than find clear-cut answers about the main causes of irrational movements of stock market prices. Such questions include: Whether increasing linkages and integration of the world markets is considered a blessing or cursing? What is the benefit of integration and liberalization as long as it may lead to losing the benefit of diversification and increasing the transmission of high volatility? Is the benefit of Liberalization of emerging stock markets justifying the high risk placed on their financial systems?, and is the liberalization of emerging stock markets coming early or being implemented too fast?

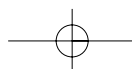
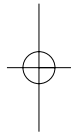
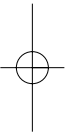


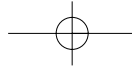
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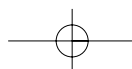
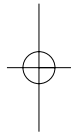
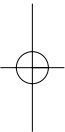


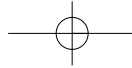
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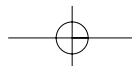
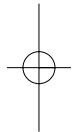
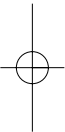


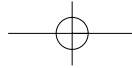
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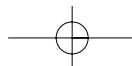
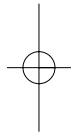
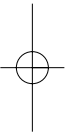


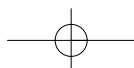
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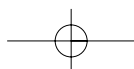
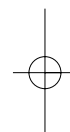
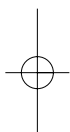


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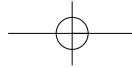


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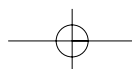
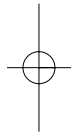
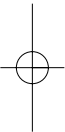


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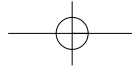


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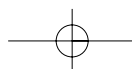
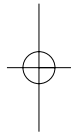
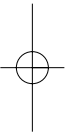




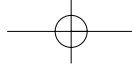
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