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Abstract:

This study intends to examine the price- volume movements in the Arab stock markets, in order to determine the impact of changes in trade volume on the volatility of stock prices as expressed by the unified MAF stock price index. The research covers a sample of eight out of the fifteen Arab stock markets included in the Arab Monetary Fund database, using monthly data from 1994 to 2006. The study found that there is an increasing in both trading volume and stock price volatility, which may be considered as a recent phenomenon in the majority of the Arab stock markets. The study also found that the volume- stock price movements are significantly integrated for all selected markets, while the highest correlation coefficient between volume and stock price movement was found in Saudi stock market, Amman stock market, Muscat stock market and Kuwait stock market respectively. Finally, the correlation between volume and prices movement is higher in the stock markets of the oil Arab states compared to the non-oil Arab states.

Kew words*: Arab stock markets, stock price volatility, trading volume volatility*
JEL CLASSIFICATION: G14; G15

1. Introduction

The Arab stock markets as well as other emerging markets are witnessing a new trading environment, due to globalization, liberalization, and integration of the world economy, which lead to introducing new practices in the last two decades in the majority of stock exchanges. Examples of such practices are: the linkages increase among the world stock markets, the increase in share of foreign ownership, the increase share of cross border stock trading

transactions, using the alternative trading system known as ATSs for stock trading, using of internet as a mean of stock trading, which changed the environment of stock trading decisions, changing of the floor trading to a screen based trading (Sabri, 2007). The majority of the above new practices are introduced gradually to the Arab stock markets. For example, today, there are five Arab stock markets including Amman, Algeria, Beirut, Egypt and Casablanca removed fully all restrictions used to be imposed on foreign trading in the stock markets, while other six Arab stock markets removed restrictions partially. Thus, the share of foreign ownership in Amman stock exchange for an example, increased to about 46% of ownership of listed securities, and in Egypt stock exchange, the share of non-residents was about 33%, of the listed securities in 2006 according to their annual reports. In addition, there are now four Arab stock markets, which have foreign cross- listed securities. The majority of Arab stock exchanges use now electronic quote-driven trading system with a short period of settlement from T+2 to T+3 days. Trading in derivatives includes stock options, and stock future was introduced recently in Kuwait stock exchange. Furthermore, there are many corporate and government bonds and treasury bills traded in the majority of the Arab stock exchanges including Islamic and conventional bonds. The last new product, which was introduced recently in the Arab stock markets is the mutual investment fund; today there are hundreds of mutual Islamic and conventional closed and open end funds traded in about ten Arab stock markets. The funds include equities and bonds portfolios, with local and foreign currencies (Sabri, 2008a).

Thus, due to the above developments, the Arab stock market recorded a significant improvement just in the recent decade compared to the last decade, and specially since 2001 as expressed by market capitalization, value of stock trading, number of listed shares and in turnover ratios of trading as presented in Table No. 1. For example, the market capitalization of the Arab stock markets increased about six times between 2001 and 2006, and the annual value traded increased from $ 42 billion to $ 1685 billion for the same period. Moreover, the stock price index as expressed by AMF price index increased from 100 points in 2001 to 413.3 points in 2005 (AMF, 2006, and 2007).

However, such changes and developments, may lead to positive aspects such as to have mature markets, however, they may be risky, changeable, and volatile, and thus increase correlation to the world stock market indices that are also associated with the high stock return volatility. In addition, may transfer the volatility of inflation and exchange rate from one market to another as happened to the financial markets in Mexico during 1994 and East Asian region during the years 1997-1998. For example, the high volatility of price indices occurred between February, and March of 2006 reflected so negative on the Arab Stock Markets.

Table No.1
Summary of Arab Stock markets Performance from 2001 to the end of 2006
In $ Million

	2001	2002	2003	2004	2005	2006
Market capitalization	152,230.05	208,858.11	361,078.15	622,422.25	1,290,853.30	888,121.16
Value traded	42,687.85	65,400.09	232,420.38	568,288.52	1,435,412.06	1,684,998.32
Shares traded	23,522.53	46,086.29	63,388.64	57,028.74	110,847.31	168,582.11
Turnover ratio	28.04	31.31	64.37	91.30	111.20	189.73
Number of listed firms	1,687	1,826	3,726	1,597	1,665	1,623
AMF price index	100.11	100.71	141.87	215.67	413.31	237.70
Source: Arab Monetary Fund, AMDB, April, 2007						

This new trend of significant increase in the traded value, market capitalization as well as the high volatility of stock prices movements may be detected in the record of the major Arab stock price indices in the last four years as presented in Table No. 2 (AMF, 2007). It shows that the AMF index for Arab stock markets increased from 2002 to 2005 significantly, while it witnessed a setback during the year 2006. Accordingly, there is a need to examine this issue in order to indicate the role trading volume in increasing the volatility of stock price indices, as both variables are associated to each other during stock trading.

Table No. 2
Volatility of Arab stock price indices during the year 2006

Arab Stock Markets	Changes in price index 2005-2006	Changes in price index 3Q to 4Q 2006
Oil Arab States		
Saudi Stock Market	-54.01%	-33.24%
Kuwait Stock Exchange	-7.45%	-0.88%
Dubai Financial Market	-54.25%	-8.84
Abu Dhabi Securities Market	-40.19%	-11.88%
Doha (Qatar) Securities Market	-33.61%	-5.84%
Bahrain Stock Exchange	2.17%	-1.65%
Muscat Securities Market	6.63%	1.88%
Non- Oil Arab States		
Cairo & Alexandria Exchanges	5.63%	10.37%
Casablanca Stock Exchange	69.69%	12.41%
Amman Stock Exchange	-33.87%	-11.21%
Beirut Stock Exchange	-5.37%	-14.46%
Khartoum Stock Exchange	-4.39%	1.23%
Tunis Stock Exchange	40.16%	10.74%
Palestine Stock Exchange	-44.08%	0.25%
Algeria Stock Exchange	-35.15%	-1.78%
Source: Arab Monetary Fund, AMDB, 2007		

2. Volume and stock price movements

The causes of stock price volatility can be explained in various models and interpretations. Including overreaction model, adverse affect of related laws model, increasing linkages model, transmission of volatility model, adverse affect of derivatives instruments model, adverse affect of related markets model including bonds and options markets, affect of volume volatility model. In more details, the following factors may be considered as the most causes for increasing stock price volatility that may lead to stock market crisis in both developed and emerging economies (Sabri, 2008a, Sabri, 2007, Sabri, 2002a):

- Changes in deposit interest rate
- Changes in exchange rate of Arab national currencies
- Changes in volume of stock trading
- The capital flow of equity portfolio from and to Arab markets
- Introducing new options and interaction attached to the listed underling shares
- Changes in the index future and index options rates of the listed underling shares
- Falling of international and leading stock price indices
- Changes in bond yields issued by the listed companies
- Change in volume of traded bonds issued by the listed companies

However, the majority of these presented factors may not be applicable to the Arab financial markets. due to the following facts:

First: the size of Arab bond markets is still limited in the Arab economy compared to stock markets.

Second: For exchange rates and interest rates, the majority of the Arab economies including the selected sample have a fixed currency arrangement against USD, except Morocco (IMF, 2007).

Third: The trading share of cross-listed firms and foreign trading is still limited and immaterial in the majority of the Arab stock markets.

Fourth: the connections to international and leading stock markets are weak and insignificant as reported by various studies.

Fifth: the options and future securities markets are not existed yet in the Arab Stock markets, except for one market.

Thus, the volume factor remains the most important factor that may drive the volatility of stock price movements. The average annual trading value for the period from 1994 to 2000 was about $ 32 billion, while the average annual trading value for the second period from 2001 to 2006 was about $ 686 billion. In addition, the value of Arab stock trading increased significantly during the 2005 and 2006 years three times from trading volume in the year 2004 (AMF, 2007). This significant increase in trading value may be connected to the available liquidity in the Arab economy, which is produced by the increased the revenues of oil exporting. For example, the oil

prices increased from $ 16 per barrel in 1994 to $ 36 in 2004 to $ 51 in 2005 to $70 per barrel in 2006, which led to increase the value of Arab oil exports from $ 83 billion in 1994 to $ 395 billion in 2006 (OAPEC, 2006).

The concept of the volume impact is built on the fact that prices need volume to move, thus, the high volatility of stock prices may be produced as consequence of volume volatility and trading activities. Various studies reported that there are significant relationships between volume and stock price movement and volatility, due to the fact that trading volume is a source of risk because of the flow of information. Example of that Saatccioglu and Starks (1998) found that volume lead stock prices changes in four out of the six emerging markets. 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. Chan et al (2000) found that trading volume for foreign stocks is strongly associated with NYSE opening price volatility. Säfvenblad, 2000 found that Swedish index returns exhibit high autocorrelation when trading volume is low. However, Jones, el at, (1994) found that the positive volatility-volume relation documented by numerous researchers reflected a positive relationship between volatility and the number of transactions. Mei, et al. (2005) found that trading caused by investors' speculative motives could explain a significant fraction of the price difference between the dual-class shares. Gallant, et al. (1992) investigated the price and volume co-movement using daily data from 1928 to 1987 for New York stock exchange and found positive correlation between conditional volatility and volume. Griffin, et, al. (2007) investigated the dynamic relation between market-wide trading activity and returns in 46 markets and reported strong positive relationship between turnover and past returns. Hsin, et al. (2003) examined the empirical evidence on the impact of speculative trading on return volatilities in Taiwan stock markets and found speculative trading activities through day trades, which increases the intraday price volatility. Song, et al, (2005) paper examined the roles of the number of trades, size of trades, and share volume in the volatility-volume relation in the Shanghai Stock Exchange and confirm that mainly the number of trades drives the volatility-volume relation. Basci et al., study (1996) reported that stock price levels and trading volume in Turkish stock markets are co-integrated. In addition, other studies reported that stock trading volume represents the highest positive correlation to the emerging stock price changes; thus represent the most predicted variables in increasing price volatility in both emerging and developing stock markets (Sabri, 2004, Sabri, 2008b).

3. Review of the related Literature

The majority of related studies dealt with the volatility of stock prices thought investigating one or more possible causes in either individual or regional markets covering developed as well as

emerging stock markets. A study by Sabri, (2002 a) reported various causes for increasing stock return volatility that may lead to stock market crises. These causes include overreaction to noise trading, reaction to earning announcements and fundamentals, liberalization of stock markets, foreign trading and volatility of cash flow to equity markets, increasing correlation between the world stock indices, transmission of volatility due to changing of bonds yield, deposit interest rates and changing in exchange rates. Increasing linkages between developed and emerging stock markets lead to increase the correlation between their stock price indices (Sabri, 2002b). The majority of stock market experts considered declining international stock indices as being the most risky factor in destabilizing the other national stock markets, thus increasing stock price volatility (Sabri, 1995a and Sabri, 1995b).

For the Arab financial markets, various studies examined the issues of the Arab stock markets in general and the issue of high price volatility in particular. Thus, we would like to represent a summary of such studies in three sections as follows:

First : Studies regarding the correlation of Arab stock markets with other markets: various studies discussed this issue, which may has an impact on the volatility in case of increasing the correlation to the other markets based on the concept of spill over volatility from other markets. Examples of studies discussed the correlation between Arab markets and other markets, Dahel (1999) found that Arab markets were characterized by low correlations with each other and with international markets and exhibited the lowest level of volatility of returns and were not affected by international financial crises. Girard, et al. (2003) concluded that the Arab stock markets were highly segmented and provide diversification benefits to the global investor. Saadi-Sedik, and Martin (2006) found that the Amman Stock Exchange and other Arab stock markets are co-integrated, while there is no co- integrating with other emerging or developed stock markets. Abraham and Al-Elg (2001) compared monthly index returns of Arabian Gulf stock markets with the USA, and has showed low or negative correlations between both markets. Sabri, (2002c) found that there is no significant positive correlation between Arab and European stock markets, based on two financial indicators including price earning ratios and performance growth factor.

Second: Studies regarding volatility and risk management: Sioud, and Hmaied (2003) examined the effect of automation in Tunisia stock exchange on the liquidity, volatility, returns and efficiency of shares traded in the Tunisian stock exchange and found no significant effects on volatility or efficiency. Haque, et al. (2004) examined the stability and persistence of shocks to volatility in ten Middle Eastern and African emerging stock markets and found that eight out of the ten markets showed an evidence of volatility clustering. Omran, and Pointon

(2001).indicated that the inflation rate had an impact on the Egyptian stock market performance. Al-Khouri and Ajlouni (2007) reported that the price-limit technique was effective in reducing the volatility in the Amman stock exchange. Al Janab (2007) examined the equity trading risk management in Casablanca Stock and found that their individual differences create unique expected return opportunities**.** Guermat, et al. (2003) examined whether the economic and political instability in most of the Arab countries lead the stock markets to become riskier than other stock markets in developed countries, and found that Arab stock markets including Egypt, Jordan, and Morocco are less risky**.** Atmeh and Dobbs (2006) investigated the performance of moving average trading rules in the Jordanian stock market and found that technical trading rules can help to predict market movements. Hassan, and Jung-Suk Yu**,** (2007) reported that in spite of the recent extreme fluctuations of the MENA stock markets, there was no strong evidence of rational speculative bubbles of both domestic and U.S.-based investors.

Third: other issues in Arab stock markets: El Serafile and Shahed (2002) discussed the concept of integration of the Arab stock exchanges in one Arab exchange, and reported that there is a need to restructuring and privatizing the Arab stock exchanges before moving to mergers or alliances experiences. Bolbol and Omran, (2004) reported that the Arab firms are still largely closed, family-owned with a narrow concentration of ownership. El- Erian and Kumar (1995) reported that the roles of equity market in developing the Arab region may be accomplished if reform policies are implemented to reduce country risk and strengthening the external payment regime. Neaime (2002) reported that the financial integration and liberalization in the Arab stock markets would increase benefits to investors and enhance growth and liquidity in these markets. BenNaceur et al., (2006) discussed the relationship between asset price movements and monetary policy in the Arab stock markets and reported that stock market responses were negligible in these countries, while in Bahrain and Saudi Arabia it appears to be more pronounced.

3. Methodology

This study analyzes the price- volume relationship in Arab stock markets in order to determine the impact of changes in trading volume on the volatility of stock prices. Thus, out of the fifteen Arab stock markets, eight markets were selected, include; Saudi stock market, Beirut stock market, Amman stock market, Kuwait stock market, Casablanca stock exchange, Bahrain Stock Exchange, Muscat stock market, and Egypt capital market. The selected sample included four stock markets from oil Arab states and four states from non-oil Arab states. The definition of oil Arab states in this research is based on the value of oil revenues per capita of $2000 or more, thus Egypt is considered as a non-oil Arab state according to this definition. A summary of the main data regarding the selected Arab stock markets including market capitalization value,

number of listed securities, and the annual traded value during the year 2006 are presented in Table No. 3. As shown in the table, the selected sample represents about 83% of the listed companies, 73% of the market capitalization, and 92% of the traded value of the Arab stock markets.

Table No. 3
The Selected Sample of Arab stock markets, 2006 in $ Million

Markets	Listed Companies	Market Capitalization	Traded Value
Non- Oil States			
1. Egypt capital market	632	84,784.74	48,954.42
2. Amman Stock Exchange	222	32,709.74	21,616.25
3. Casablanca Stock Exchange	58	42,750.38	9,109.88
4. Beirut Stock Exchange	16	7,135.22	2,031.88
Oil Arab States			
5. Saudi Stock Market	81	457,381.03	1,402,942.30
6. Kuwait Stock Exchange	175	106,825.45	59,600.21
7. Bahrain Stock Exchange	50	13,030.00	1,654.00
8. Muscat Stock Exchange	121	21,122.00	2,214.21
Share from Arab market	83%	73%	92%

Sources: AMF, 2006 and AMF, AMDB, 2007.

The majority of the related studies conducted on other markets used daily or weekly data to examine this issue in the world stock markets. However, this study selected monthly data, which gives enough time for trading price movement in response to volume movement. For example, Gervais et al. 2001 found that individual stocks whose trading is extraordinarily large over a period of a week tended to experience large returns over the next month. The trading volume in stock markets may be expressed by the number of trades, number of traded shares and by the value of trading. This study selected the value of stock trading as expressed by US dollars. Thus, the monthly data for both traded values and end of month AMF price index from 1994 to 2006 were included in this study, which incorporated a sample of about 144 observations. The selected price index is the unified index developed by the Arab Monetary Fund for Arab stock markets and was calculated based on US$, with 100 base points started in 1994. The sources of the data were from the Arab Monetary Fund database, (AMF, database, 2007).

The standard deviations of both volume and AMF Price index were calculated for the entire period of investigation from 1994 to 2006 to estimate the historical monthly volatility for both volume and price index for each of the eight stock markets. In addition, the standard deviation of AMF price index for each of the eight Arab states was also calculated for the period from 1994 to 2000 and from 2001 to 2006. In order to indicate to what extent the stock price volatility has increased during the second period that witnessed a significant increase in the trading volume as

expressed by value and volatility, compared to the first period. Finally, in order to investigate the stock price -volume movements, the Pearson's correlation coefficient was calculated based on the linear association between the two main variables including the monthly traded values and the end month AFM price index, for each of the selected eight Arab stock markets.

5. Summary and Conclusion

This study intended to discuss the stability of the Arab stock markets as expressed by volatility of trading volume, and their association to the volatility of stock prices, which became a new phenomenon attached to the trading environment in the Arab stock markets, especially since 2004 and up to now (2008). The study selected eight Arab stock markets out of fifteen existing Arab stock markets, which formed about 75% of the trading value share of the total Arab stock markets. The sample included four oil Arab states and four non-oil Arab states, using the unified stock price index formulated by the Arab Monetary Fund known as AMF price index, which was started in 1994 at 100 points, and calculated based on US dollars.

This conclusion regarding to the Arab stock markets was consistent with the studies related to other markets, which also found that the volume volatility represents the most predicted variable of increasing price volatility, and both volume and prices are integrated with each other. This conclusion was found in Latin America stock markets as reported by Saatccioglu and Starks (1998) and Christofi, and Pericli (1999), in Swedish stock market as reported by Säfvenblad, (2000), in New York stock exchange as reported by Gallant, et al. (1992), in Taiwan stock market as reported by Hsin, et al. (2003), in selected developed stock markets as reported by Sabri (2008b), selected emerging stock markets as reported by Sabri, (2004) and De Santis and Imrohorglu, (1997), in Shanghai Stock Exchange as reported by Song, et al, (2005) and Mei, et al. (2005), and in Turkish stock market as reported by Basci et al. (1996).

The question arises here about the major factors that may drive the Arab stock market to volume volatility. In general, the trading volatility may be associated to the transmission impact from other major markets and to the volatility spillovers concept from leading stock markets. However, this factor is not applied to the Arab stock markets, because of the weak correlation between Arab stock markets and other international markets including developed and emerging markets as reported by various studies (Dahel, 1999; Girard, et al., 2003; Saadi-Sedik, and Martin, 2006; Abraham and Al-Elg, 2001; and Sabri, 2002c). Accordingly, the possible interpretation is related to the fact that the stock trading volatility is motivated by liquidity connected to oil revenues which is witnessing a high volatility as shown during January and February of 2008, in which the oil prices swings between $80 and over $100 per

barrel. However, this assumption needs to be examined in the light of new development in both oil and stock markets.

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