
The impact of trading volume on stock price volatility in the Arab economy

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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 AMF stock price index. The research covers a sample of eight out of the 15 Arab stock markets included in the Arab Monetary Fund database, using monthly data from 1994 to 2006. The study found that there is an increase in both trading volume and stock price volatility, which may be considered 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 (to lowest) correlation coefficient between volume and stock price movement was found in the Saudi stock market, Amman stock market, Muscat stock market, and Kuwait stock market (in that order). Finally, the correlation between volume and price movement is higher in the stock

markets of the oil Arab states compared to the nonoil Arab states.

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INTRODUCTION

The Arab stock markets, as well as other emerging markets, are witnessing a new trading environment, due to globalisation, liberalisation, and the integration of the world economy, which has led to the introduction of 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 in share of cross-border

Table 1: Summary of Arab stock markets performance from 2001 to the end of 2006 (\$million)

	2001	2002	2003	2004	2005	2006
Market capitalisation	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.

stock trading transactions, the use of the alternative trading system known as ATS for stock trading, and the use of the internet as a means of stock trading, which changed the environment of stock trading decisions from floor trading to screen-based trading.¹ The majority of these new practices have been introduced gradually to the Arab stock markets. For example, today, there are five Arab stock markets, including Amman, Algeria, Beirut, Egypt, and Casablanca, that have fully removed all the restrictions that used to be imposed on foreign trading in stock markets, while the other six Arab stock markets have only partially removed restrictions. Thus, the share of foreign ownership in the Amman stock exchange, for example, increased to about 46 per cent of ownership of listed securities, and in the Egypt stock exchange the share of non-residents was about 33 per cent of the listed securities in 2006 according to their annual reports. In addition, there are now four Arab stock markets that have foreign cross-listed securities. The majority of Arab stock exchanges now use an 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 the 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 that 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.²

Thus, due to the above developments, the Arab stock market recorded a significant improvement in the past decade compared to the decade before that, and especially since 2001, as expressed by market capitalisation, value of stock trading, number of listed shares, and turnover ratios of trading, as presented in Table 1. For example, the market capitalisation of the Arab stock markets increased about six times between 2001 and 2006, and the annual value traded increased from \$42 billion to \$1,685 billion for the same period. Moreover, the stock price index as expressed by the Arab Monetary Fund (AMF) price index increased from 100 points in 2001 to 413.3 points in 2005.^{3,4}

Table 2: Volatility of Arab stock price indices during the year 2006

<i>Arab stock markets</i>	<i>Changes in price index 2005–2006 (%)</i>	<i>Changes in price index 3Q–4Q 2006 (%)</i>
<i>Oil Arab states</i>		
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
<i>Nonoil Arab states</i>		
Cairo and 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.

Such changes and developments may lead to positive aspects such as mature markets, but they may be risky, changeable, and volatile and thus may increase correlation to the world stock market indices that are also associated with the high stock return volatility. In addition, they 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 the East Asian region during 1997–1998. For example, the high volatility of price indices that occurred between February and March of 2006 reflected quite negatively on the Arab stock markets.

This new trend of significant increase in traded value, market capitalisation, and high volatility of stock price movements can be detected in the record of the major Arab stock price indices in the last four years, as presented in Table 2.⁴ The table 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 of trading volume in increasing the volatility of stock price indices, as both variables are associated to each other during stock trading.

VOLUME AND STOCK PRICE MOVEMENTS

The causes of stock price volatility can be explained in various models and interpretations, including overreaction model, adverse effect of related laws model, increasing linkages model, transmission of volatility model, adverse effect of derivatives instruments model, adverse effect of related markets model (including bonds and options markets), and effect of volume volatility model. The following factors may be considered the most common causes for increasing stock price volatility, which may lead to stock market crisis in both developed and emerging economies are^{1,2,5}:

- 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 underlying shares.
- Changes in the index future and index options rates of the listed underlying 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.

The majority of these presented factors may not be applicable to the Arab financial markets for the following reasons:

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 for Morocco.⁶

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 do not yet exist in the Arab stock markets, except for in 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 between 2005 and 2006, three times from the trading volume in the year 2004.⁴ This significant increase in trading value may be connected to the available liquidity in the Arab economy, which is produced by the increased revenues of oil exporting. For example, the oil prices increased from \$16 per barrel in 1994 to \$36 in 2004 to \$51 in 2005 and to \$70 per barrel in 2006, which led to an increase in the value of Arab oil exports from \$83 billion in 1994 to \$395 billion in 2006.⁷

The concept of the volume impact is built on the fact that prices need volume to move, and thus the high volatility of stock prices may be produced as a consequence of volume volatility and trading activities. Various studies have 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. Saatcciglu and Starks⁸ found that volume leads stock price changes in four out of the six emerging markets. Blume *et al.*⁹ stated that a portion of the losses on S&P stocks in October 1987 was related to the magnitude of the trading volume. Säfvenblad¹⁰ found that Swedish index returns exhibit high autocorrelation when trading volume is low. Jones *et al.*,¹¹ however, found that the positive volatility–volume relation documented by numerous researchers reflected a positive relationship between volatility and number of transactions. Mei *et al.*¹² 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.*¹³ investigated the price and volume co-movement using daily data from 1928 to 1987 for the New York stock exchange and found positive correlation between conditional volatility and volume. Griffin *et al.*¹⁴ investigated the dynamic relation between market-wide trading activity and returns in 46 markets and reported a strong positive relationship between turnover and past returns. Hsin *et al.*¹⁵ 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.*’s¹⁶ 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 confirmed that mainly the number of trades drives the volatility–volume relation. Basci *et al.*’s (1996) study 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 and thus represents the most predicted variables in increasing price volatility in both emerging and developing stock markets.^{17,18}

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 Sabri⁵ 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, liberalisation 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 an increase in the correlation between their stock price indices.¹⁹ The majority of stock market experts considered declining international stock indices the most risky factor in destabilising the other national stock markets, thus increasing stock price volatility.^{20,21}

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. The following is a summary of these studies in three paragraphs as follows:

First: Studies regarding the correlation of Arab stock markets with other markets: various studies

discussed this issue, which may have an impact on the volatility in case of increasing the correlation to the other markets based on the concept of spillover volatility from other markets. Examples of studies discussing the correlation between Arab markets and other markets include the following: Dahel²² found that Arab markets were characterised 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.*²³ concluded that the Arab stock markets were highly segmented and provide diversification benefits to the global investor. Saadi-Sedik and Martin²⁴ found that the Amman stock exchange and other Arab stock markets are co-integrated, whereas there is no co-integrating with other emerging or developed stock markets. Abraham and Al-Elg²⁵ compared the monthly index returns of Arabian Gulf stock markets with the USA, and have shown low or negative correlations between both markets. Sabri²⁶ found that there is no significant positive correlation between Arab and European stock markets, based on two financial indicators: price earning ratios and performance growth factor.

Second: Studies regarding volatility and risk management: Sioud and Hmaied²⁷ examined the effect of automation in the Tunisia stock exchange on the liquidity, volatility, returns, and efficiency of shares traded and found no significant effects on volatility or efficiency. Haque *et al.*²⁸ 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 evidence of volatility clustering. Omran and Pointon²⁹ indicated that the inflation rate had an

impact on the performance of the Egyptian stock market. Al-Khouri and Ajlouni³⁰ reported that the price-limit technique was effective in reducing the volatility in the Amman stock exchange. Al Janab³¹ examined the equity trading risk management in Casablanca stock and found that their individual differences create unique expected return opportunities. Guermat *et al.*³² 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 Dobbs³³ investigated the performance of moving average trading rules in the Jordanian stock market and found that technical trading rules can help predict market movements. Hassan and Yu³⁴ reported that in spite of the recent extreme fluctuations of the MENA stock markets, there was no strong evidence of rational speculative bubbles of either domestic or US-based investors.

Third: Other issues in Arab stock markets: El-Serafile and Shahid³⁵ discussed the concept of the integration of the Arab stock exchanges into one Arab exchange, and reported that there is a need to restructure and privatise the Arab stock exchanges before moving to mergers or alliances. Bolbol and Omran³⁶ reported that the Arab firms are still largely closed and family-owned, with a narrow concentration of ownership. El-Erian and Kumar³⁷ 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 strengthen the external payment regime. Neaime³⁸ reported that the financial integration and liberalisation in the Arab stock markets would increase benefits to investors and enhance

growth and liquidity in these markets. Ben Naceur *et al.*³⁹ 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, whereas in Bahrain and Saudi Arabia they appear to be more pronounced.

METHODOLOGY

This study analyses 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 15 Arab stock markets, eight markets were selected: the 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 stock markets from nonoil Arab states. The definition of oil Arab states in this research is based on the value of oil revenues per capita of \$2,000 or more; thus Egypt is considered a nonoil Arab state according to this definition. A summary of the main data regarding the selected Arab stock markets, including market capitalisation value, number of listed securities, and the annual traded value during the year 2006, is presented in Table 3. As shown in the table, the selected sample represents about 83 per cent of the listed companies, 73 per cent of the market capitalisation, and 92 per cent of the traded value of the Arab stock markets.

The majority of the related studies conducted on other markets used daily or weekly data to examine this issue in the world stock markets. This study, however, selected monthly data, which gives enough time for trading price movement in response to volume movement. For example, Gervais *et al.*⁴⁰ found that

Table 3: The selected sample of Arab stock markets, 2006 (\$million)

<i>Markets</i>	<i>Listed companies</i>	<i>Market capitalisation</i>	<i>Traded value</i>
<i>Nonoil states</i>			
Egypt capital market	632	84,784.74	48,954.42
Amman stock exchange	222	32,709.74	21,616.25
Casablanca stock exchange	58	42,750.38	9,109.88
Beirut stock exchange	16	7,135.22	2,031.88
<i>Oil Arab states</i>			
Saudi stock market	81	457,381.03	1,402,942.30
Kuwait stock exchange	175	106,825.45	59,600.21
Bahrain stock exchange	50	13,030.00	1,654.00
Muscat stock exchange	121	21,122.00	2,214.21
Share from Arab market (%)	83	73	92

Source: AMF.^{3,4}

individual stocks whose trading was 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 value of trading. This study selected the value of stock trading as expressed in 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 AMF 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 AMF database.⁴

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, the Pearson's correlation coefficient was calculated based on the linear association between the two main variables, (the monthly traded values and the end of month AMF price index), for each of the selected eight Arab stock markets.

FINDINGS

This study aims to point out the impact of trading volume as expressed by monthly values

on the volatility at the end of month stock price index for each of the eight selected Arab stock markets. This part will be presented in three paragraphs as follows:

First: The volatility of trading volume in the Arab stock market: the size, numbers of transactions, volume, values, and volatility of stock trading have been increasing significantly in the majority of the Arab stock markets. As shown in Table 4, it was found that the monthly traded value ranged between \$192 million and \$221 billion for the Saudi stock market during the period from 1996 to 2006, which produced a very high standard deviation compared to other Arab stock markets. The high standard deviation in the monthly traded values also exists in the Kuwait stock market, Egypt stock market, and Amman stock market. Thus, it may be stated that the stock traded values are increasing in the majority of stock markets as well as in the monthly trading volatility.

Second: The volatility of stock price: the base for the AMF price index for the Arab stock markets is 100 points; thus, the mean of the Arab stock markets ranged between 31.4 points for the Beirut stock market as the minimum at one end of the month and 987.6 points at one end of the month for the Saudi stock market as the maximum, as presented in Table 5. The range between the minimum and maximum of the end of month AMF price index for each of the Arab stock markets was 104 points for the Bahrain stock market as the minimum among all other Arab stock markets and 903 points for the Saudi stock market as the maximum. Thus, the volatility of stock price index in the Saudi stock market is considered the most volatile market as expressed by the standard deviation factor,

Table 4: Descriptive analysis of monthly volume in \$million for the selected sample of the Arab stock markets (1994–2006)

<i>Arab states</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Standard deviation</i>
<i>Oil states</i>					
Saudi stock market ^a	129	192.06	220,902.25	23,796.8	43,869.4
Bahrain stock market	144	3.42	429.58	35.4	46.2
Muscat stock market	144	7.25	649.8	123.1	124.1
Kuwait stock market	136	96.40	10,460.41	2,132.8	2,028.2
<i>Nonoil states</i>					
Amman stock market	144	15.09	3,281.93	384.1	739.3
Beirut stock market ^a	129	0.03	449.9	34.6	69.8
Casablanca stock market	144	5.98	3,258.96	202.1	401.3
Egypt stock market ^a	129	42.87	6,529.59	9,532	1,127.5

^aMonthly observations from 1996 to 2006.

Source: Based on Arab Monetary Fund, AMDP, 2007

Table 5: Descriptive analysis of monthly price AMF index for the selected sample of the Arab stock markets (1994–2006)

<i>Arab states</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Standard deviation</i>
<i>Oil states</i>					
Saudi stock market	129	84.36	987.6	233.4	222.1
Kuwait stock market	136	91.05	440.50	167.0	86.51
Bahrain stock market	144	88.44	192.75	122.2	29.6
Muscat stock market	144	64.09	276.11	128.5	49.4
<i>Nonoil states</i>					
Amman stock market	144	91.29	612.46	173.4	130.3
Casablanca stock market	144	91.6	365.40	191.6	57.9
Beirut stock market	129	31.4	154.1	63.2	27.8
Egypt stock market	129	45.91	187.87	91.99	34.7

Source: Based on Arab Monetary Fund, AMDP, 2007

followed by the Amman stock market and Kuwait stock market. The Egyptian stock market, Beirut stock market, and Bahrain

stock market were the least regarding the phenomenon of stock price volatility among the eight Arab stock markets.

Table 6: Change in the monthly historical volatility of stock prices index as expressed by standard deviation between the two periods

<i>Selected Arab stock markets 1994–2000^a 2001–2006^b</i>		
<i>Oil states</i>		
Saudi stock market	13.8	261.8
Bahrain stock market	15.9	35.3
Kuwait stock market	21.9	97.5
Muscat stock market	50.4	48.4
Average	25.5	110.8
<i>Nonoil states</i>		
Amman stock market	9.2	163.3
Casablanca stock market	55.6	57.7
Beirut stock market	17.8	32.7
Egypt stock market	22.0	40.0
Average	26.2	73.4

^aSample 75.

^bSample 69.

Comparing the two periods (1994–2000 and 2001–2006), we found that the historical monthly price volatility has increased in the second period compared to the trading in the first period in the 1990s in all selected Arab stock markets, with the exception of the Muscat stock market as presented in Table 6.

The historical monthly price volatility in the other Arab stock markets increased from two times in the case of the Egypt stock market, Beirut stock market, and Bahrain stock market, to about 18 times in the case of the Amman stock exchange, to 20 times in the case of the Saudi stock market, which is considered the most volatile Arab stock market. In general,

there was more volume volatility in the oil state stock markets than in the nonoil state stock markets. The Amman stock market is the most volatile market among nonoil state markets regarding volume trading, while the Saudi stock market has the most volatile market among the oil states in this regard.

Third: The volume–price movement in the Arab stock markets: the Pearson test was used for each of the selected Arab stock markets to determine the correlation between volume and price movement for the whole period from 1994 to 2006, using monthly observations as shown in Table 7.

The results show that the volume–price association is significantly integrated for all of the selected markets. The highest (to lowest) correlation coefficient between volume and stock price movement was found in the Saudi stock market, Amman stock market, Muscat stock market, and Kuwait stock market (in that order). They show a correlation coefficient of 0.773 and above, while the lowest correlation was found in the Casablanca stock market, which reported a relatively low, but significant, correlation of 0.328. For the oil Arab states, the correlation between volume and price of stock markets is higher than that for nonoil Arab states, with the exception of Bahrain, while the correlation in nonoil Arab states is smaller, with the exception of Amman stock market. Similar conclusions are found for the period from 2001 to 2006, which shows that the Saudi stock market has the highest correlation between volume and price movements, while the Casablanca stock market shows the least correlation.

After comparing the two periods, however, we found that all nonoil Arab states show a significant increase in volume–price correlation, with the exception of the Casablanca stock market, while the oil Arab states had high

Table 7: Volume–price movement correlation in the selected Arab stock markets for the period (1994–2006)

<i>Arab stock markets</i>	<i>Pearson correlation</i>	<i>Rank based on correlation</i>
<i>Oil states</i>		
Saudi Stock Market ^a	0.953 ^b	1
Muscat Stock Market	0.863 ^b	3
Kuwait Stock Market	0.773 ^b	4
Bahrain Stock Market	0.536 ^b	7
Average correlation	0.775^b	
<i>Nonoil states</i>		
Amman stock market	0.942 ^b	2
Beirut stock market ^a	0.636 ^b	5
Egypt stock market ^a	0.601 ^b	6
Casablanca stock market	0.328 ^b	8
Average correlation	0.625^b	

^a1996–2006.

^bCorrelation is significant at the 0.01 level.

correlation in both periods. In addition, the correlation between volume and price movements in the Saudi stock market had increased significantly in the recent period, as presented in Table 8. Finally, the average correlation of volume price movements of nonoil Arab stock markets had increased from 0.567 in the first period to 0.733 in the second period. Therefore, it may be concluded that the nonoil state stock markets are now more volatile after 2001, and thus they are becoming more risky markets.

SUMMARY AND CONCLUSION

This study intended to discuss the stability of the Arab stock markets as expressed by volatility of

Table 8: Volume–price index correlation in the selected Arab stock markets for the period (2001–2006)

<i>Arab stock markets</i>	<i>Pearson correlation</i>	
	<i>1994–2000</i>	<i>2001–2006</i>
<i>Arab states</i>		
Saudi stock market ^a	0.650	0.939
Muscat stock market	0.9150	0.846
Kuwait stock market	0.765	0.668
Bahrain stock market	0.735	0.478
Average oil Arab stock markets	0.766	0.733
<i>Nonoil states</i>		
Amman stock market	0.411	0.923
Egypt stock market ^a	–0.101	0.9140
Beirut stock market ^a	0.516	0.7850
Casablanca stock market	0.645	0.310
Average nonoil Arab stock markets	0.368	0.733
Average Arab stock markets	0.567	0.733

^a1996–2006.

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. The study selected 8 Arab stock markets out of 15 existing Arab stock markets, which formed about 75 per cent of the trading value share of the total Arab stock markets. The sample included four oil Arab states and four nonoil Arab states, using the unified stock price index formulated by the AMF price index, which was started in 1994 at

100 points, and calculated based on US dollars. Using one unified currency and one level of measurement gives more validity for comparison between the individual samples of the Arab stock markets. Finally, in order to accomplish the objectives of the study, the historical monthly standard deviations for both volume and AMF price index were calculated for the whole period of the investigation from 1994 to 2006, as well as for each of the two separate periods from 1994 to 2000 and from 2001 to 2006. Thereafter, the Pearson correlation test was calculated to point out to what degree the volatility of volume is associated with volatility of stock price return.

This study found that the stock trading value is increasing significantly in the majority of stock markets, as well as in the monthly trading volatility. This new phenomenon has become more common in recent years compared to the 1990s, and it is more significant in the stock markets of the Arab oil states than in nonoil Arab stock markets. This conclusion is also applied to stock price volatility, especially in the case of the Saudi stock market and Kuwait stock market. The Amman stock market is the most volatile market in the Arab nonoil stock market, as expressed by the standard deviation of the end of month price index as shown in the second period from 2001 to 2006. This study reported that the volume–stock price movements are integrated significantly for all selected samples in the Arab stock markets. The correlation between the two variables of trading volume and stock prices volatility was, however, more significant recently than during the trading period of the 1990s for the nonoil Arab stock state markets, while it was significantly correlated in both periods in the oil Arab state markets. In addition, the movement of the volume–price in Amman, Egypt, and Beirut stock trading is closer to the

nonoil Arab stock markets than to the Casablanca stock market.

This conclusion regarding 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 Saatcciglu and Starks⁸ and Christofi and Pericli,⁴¹ in the Swedish stock market as reported by Säfvenblad,¹⁰ in the New York stock exchange as reported by Gallant *et al.*,¹³ in the Taiwan stock market as reported by Hsin *et al.*,¹⁵ in selected developed stock markets as reported by Sabri,¹⁸ in selected emerging stock markets as reported by Sabri¹⁷ and De Santis and Imrohorglu,⁴² in the Shanghai stock exchange as reported by Song *et al.*¹⁶ and Mei *et al.*,¹² and in the Turkish stock market as reported by Basci *et al.*⁴³

The question arises here as to 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. This factor is not, however, 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.^{22–26} 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 swing between \$80 and over \$100 per barrel. This assumption needs to be examined in the light of new developments in both oil and stock markets.

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