Journal of Administrative and Economic Sciences
Qassim University, Vol. 5, No. 1, PP 1-19. (November 2011/Muharram 1433H)

Stock Crises and Stock Behavior: Case of Saudi Stock Market

Abdulrahman A. M. Al-Twaijry
Professor of Accounting, Accounting Department,
College of Business & Economics, Qassim University,

(Received 3/1/2009; accepted for publication 23/9/2009)

Abstract. The Saudi stock market is more than 25 years old, and since its birth in 1985 and until 2005, there has been no major collapse. However, during the last few years (2006 – 2009), the market has witnessed two crises, the first is a major one and the second is minor. The purpose of this research is to determine the impact of the 2006 stock crisis on the stock market behavior and examine the effect of this crisis on stock prices and stock returns using three models (financial, economic and accounting). The comparison and regression results reveal that stock market behavior did change after the crisis. The financial model has been heavily affected by the crisis (adjusted R2 declined from 0.41 to 0.15 only after the crisis), whilst the economic model has only slightly changed (adjusted R2 was 0.61 before the crisis and 0.62 after it). The accounting model was also affected by the 2006 crisis, but not significantly. Even though the power of the model was lower after the crisis, it remained high and significant.

***Keywords*:** Saudi stock crises, Share prices, Stock returns, Regression, Models.

Introduction

The Saudi Stock Market is a relatively recent phenomenon and has only developed as a recognized market within the last eight years. Since its birth until the mid of 2003, the market was almost stable. Then a sharp increase peaked in February 2006. From 2006 until now (10-10-2009), the stock market has gone through two crises (in 2006 and 2008).

Stock crises have a strong effect not only on people, but also on economical and financial hypotheses and theories. This has led to an existence of new field of study and area of research, which can be called "stock market crises studies." The current study can be categorized as one of these studies. The aim of this study, however, is to examine how stock prices and returns can be affected by stock crises using Saudi stock market as a case study.

As explained by Wikipedia, the stock market crash is "a sudden dramatic decline of stock prices across a significant cross-section of a stock market. Crashes are driven by panic as much as by underlying economic factors. They often follow speculative stock market bubbles." Throughout the history, many stock market crises occurred with a short or long run effect. However, the most noticeable global crises are the 1929, October 1987 as well as the middle periods of 1997, 2001, 2008-9. As a cause of, or a result of such crises, many corporate accounting scandals have arisen in major and global companies. Australian Merchant Bank, Nugan Hand Bank, Enron, WorldCom, Tyco International, OneTel, and HIH International are famous cases of disaster.

Although there are large volumes of research on stock market prices and returns, fewer are concerned with stock crises and most of these studies focused on developed countries. The impacts of stock crises in recently developing markets, such as the Saudi stock market, are still under researched, and thus, more studies are warranted. The effects of the stock market crises can be of many different forms and shapes. Here we are investigating the possible effect on stock market behavior using three dimensions. The first is the relationship between share price and share performance. The second is the relation between share price and share traffic. The third is the application of the accounting conservatism theory.

Literature Review

The prices, earnings and returns of shares were the spotlight of the vast majority research on stock markets. Different approaches were utilized. Some studies (for example, Fair, 2002; Damir, 2006; and Liu, 2006) used time series data to review stock market behavior in the past and to predict the future. Some other studies (such as, Campbell and Shiller, 1988; Goetzmann and Jorion, 1995; Lettau and Ludvigson, 2005; Lee, 2006) focused on investigating the relationship between share prices and company performance, whilst others (for instance, Crouch, 1970; Smirlock and Starks, 1985; Hiemstra and Jones, 1995; Silvapulle and Choi, 1999; Groenewold 2004) looked at the relationship between share prices or share returns

and trade volume. Some researchers (for example, Ray and Tsay, 2000; Areal and Taylor, 2002; Cochran and Mansur, 2002; Sabri, 2004; Nguyen and Bellalah, 2008; Hung, 2009) focused on the stock market volatility. Cochran and Mansur used monthly basis and various five-year intervals for nearly 70 years and found that stock volatility is much larger in recent times. This volatility could be caused by stock crises. Sabri studies the relationship between Stock Return Volatility and Market Crisis.

One important conclusion of the findings of these studies is that stock market behavior and stock market components are sensitive to various factors. The consequence of some factors can be a disaster that leads to a stock market crisis. Throughout the history of the worldwide stock market, there were unforgettable tragedies, tragedies that had a great impact on both investors' decisions and stock market behavior. Many studies endeavored to investigate the causes and/or the outcomes of the stock market crises. The majority of the these studies took place in the developed nations (for recent studies, see for example, Vo and Daly, 2005; Patev *et. al.* 2006; Crouzille, *et. al.* 2006; Mahmood and Ali, 2007; Siklos, 2008; Zhou and Sornette, 2009) but much fewer are concerned with stock market crises in developing markets.

One of the recent studies of developing stock market is Al-Twaijry (2007). Al-Twaijry looked at the history of the Saudi stock market from its formal initial and partially discussed the stock market crisis of 2006. His results suggested that EPS and DPS are not good predictors of share prices during the time of crisis. R^2-adjusted dropped from 0.62 in the year before the crisis (2005) into 0.04 in the crisis year (2006). However, Al-Twiajry concluded that daily number of trades, turnover, and values had a strong association with stock prices even during the market crises. Al-Twaijry had assumed that the stock market crisis, which started end of February 2006, had lasted only for a few months, and that there had been no justification for this assumption. The crisis had not ended until the begging of 2007 because the behavior of the share prices was not stable until 2007.

Conservatism in accounting, which is one of the most ancient and most pervasive principles of accounting valuation (Sterling, 1970), means recognizing bad news earlier than good news on financial statements, and thus, in share earnings and share prices. Basu (1997), Watts (2003), Bal and Sadka (2005) saw conservatism to be one of most important principles of accounting. Browning and Weil (2002) suggested that the investors' anxieties about accounting problems could lead to stock market collapse. To empirically examine the principle of conservatism three approaches were used: net asset measures, earnings and accrual measures, and earnings/stock returns relation measures. Basu (1997) has developed an equation using the third approach and used his model to regress annual earnings on stock returns of the same year using U.S. data. Basu's findings were consistent with his predictions of conservatism. Using variations on this methodology, some studies, such as Ball, *et. al*. (2000) and Holthausen and Watts (2001), reported similar result. The newest study in this context is the study of Warganegara and Vionita (2009). Warganegara and Vionita focused on earnings quality in Indonesian capital market

using piecewise-linear regressions model developed by Basu (1997). Conditional conservatism theory was examined through the financial crisis which took place 1997. The regression results, in general, showed that prior to the crisis, share returns did not lead the earnings whiles earnings reflect good news more promptly than bad news after the crisis. This suggests that asymmetric recognition of bad news was more prominent before the crisis while recognition of good news was more prominent after the crises. The authors, though, concluded that the level of conditional conservatism in the financial accounting system in Indonesia had declined after the crisis. In addition, the results of the study established that after the crisis, accounting practice had become less conservative since association between earnings and returns became weak.

Data and Methodology

The data of this study was collected from all available Saudi stock companies (70 in 2005 and 46 in 2007) and stock prices and index. *Tadawul* is the main source of the data, which consist of numbers of shares traded, volumes, values, share dividends, share earnings, share book values, equity returns, returns on total assets, dividend yields, and share prices and the index. Since some stock companies had not revealed all or some of this information, they were excluded from the sample.

The purpose of this study is to examine the impact of the 2006 stock crisis on the three theoretical models that were built in a normal framework find out to what extent the crisis might have on these models and in which direction it pushed them. This will be done through a comparison of the models' estimation results before the crisis to the results after the crisis.

First Model (A Financial Theory)

According to the financial asset pricing theory, the share price is the discounted value of future expected dividends which can be modeled as follow, assuming that the long term cost of equity is constant:

$$P_t = E\left(\int_t^{\infty} e^{-i(s-t)}\, D(s)\quad ds\right)$$

where:
P_t is the current share price at time t,
i is the risk adjusted discount rate,
D(s) is the dividends at time s, and
E is the expectation operator at time t.

This equation reveals that the holder of a share is interested in the entire sequence of dividend payments. This infinite sequence can be represented by two factors, the current dividends and the expected growth in the dividends. Based on the fact that the most important and predictable cause of growth in a firm's dividends is the profit, the above equation can be replaced by the following model:

$$P_t = a_o + a_1 D_t + a_2 I_t + u_t$$

where:
P_t is the share price at time t.
D_t is the dividends at time t.
I_t is the profit at time t.
u_t is the disturbance term.

This model was initially introduced by Gordon (1959) and developed and estimated by many following researchers. It is appropriate with price index and aggregate time series date. However before using it for individual firms, the dependent variable (**P_t**) needs to be adjusted to eliminate any possible size effect. This adjustment can be done through dividing share market price (**P_t**) by share book value (**BV_t**). Therefore the above model will become as follows:

$$P_t / BV_t = a_o + a_1 D_t + a_2 I_t + u_t$$

Second Model (An Economical Philosophy)

According to the economic pricing theory, the market price of a commodity in a competitive market is determined by both demand and supply sides. This means that the share price is affected by the share trade. The following model which was estimated by Al-Twaijry (2007), suggests that the changes in the share price can be predicted via the changes in the number, volume, and value of trades:

$$P = b_1 \log(\text{Trades}) + b_2 \log(\text{Volume}) + b_3 \log(\text{Value}) + e$$

It should be noticed that the use of the natural logarithm is more appropriate here to make the regression more sensible. Although there is no constant in this model, the decision on whether to leave out the constant should be based on its significance. Similarly, and as we said about the financial model, to eliminate the likelihood of size effect, the dependent variable should be controlled by the share book value, and thus the model will become as following:

$$P / BV = a_o + b_1 \log(\text{Trades}) + b_2 \log(\text{Volume}) + b_3 \log(\text{Value}) + e$$

Third Model (An Accounting Principle)

Conservatism is an important principle in financial accounting field and could be defined as a differential or asymmetric standard of verifiability for gains and losses. The earnings/stock returns relation measure is widely used to test this principle empirically. Ball and Brown (1968) argued that share price reflects all relevant information from different resources including sources from other than current accounting earnings, and so share price shall lead the accounting earnings.

Basu (1997) predicts that stock returns and earnings tend to reflect losses in the same period, but stock returns reflect gains earlier than earnings. To provide estimates of his conservatism measure, Basu (1997) developed the following regression model:

$$\frac{X_{it}}{P_{it-1}} = \alpha_0 + \alpha_1 D + \beta_0 R_{it} + \beta_1 R_{it} * D$$

where:
X_{it} is net income per share for firm i in financial year t,
P_{it-1} is stock price for firm i at the beginning of the year.
R_{it} is the period return for firm i in year t,
D s a dummy variable, take 1 if Rit is negative and 0 if otherwise.

To avoid any possible size effect, the company return should be measured in terms of an asset unit or an equity unit. Thus, this model will be developed and the company period return (**R_{it}**) will be divided by the company's total assets in order to obtain the return on assets. Also this model will be examined using return on equity as an alternative of return on assets, which will help comparing the extent of crisis effect on assets and equity.

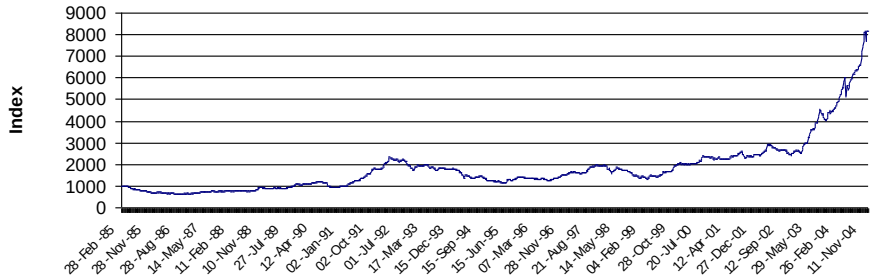
Saudi Stock Market at Glance

The oldest Saudi stock company was initiated around 70 years ago. However, the formal record of the stock index can be traced back to 1985. The first day of the stock index was the 28th of February 1985, and it commenced with 1,000 points, when there were about 50 joint stock companies. The number of companies had doubled by 1995 and then declined to about 90 by the end of 2000. As of September 30, 2009, publicly held Saudi companies were 135 registered stock companies representing fifteen sectors: banking (11), petrochemical industries (14), cement (8), retail (9), energy & utilities (2), agriculture & food industries (15), telecommunication & information technology (4), insurance (25), multi-investment (7), industrial investment (11), building & construction (13), real estate development (7), transport (4), media and publishing (3), hotel & tourism (2).

The Saudi Shares Registration Company was established in 1985 (Al-Rumaihi, 1997, p.182), and in 1990, the Electronic Securities Information System was introduced by the Saudi Arabian Monetary Agency, the Saudi central bank (Azzam, 1993), while the Saudi Stock Company (TADAWUL) was created in October 2001. The first vital regulation knowing as “Capital Market Law,” which restructured the capital market in the Kingdom, was introduced in July of 2003.

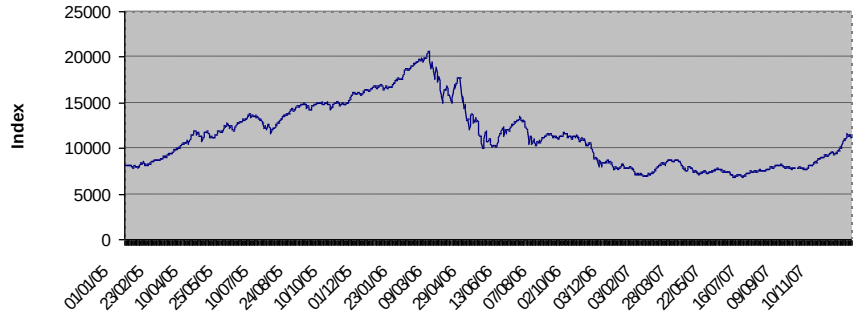
Despite the fact that the number of Saudi Stock Companies is relatively small, the stock market represents about 60% of the invested capital in the country. On the other hand, the Saudi stock market is the largest market in the entire Arab World.

Graph (1) explains the behavior of the general stock price index from its birth until end of 2004 (before the dramatic changes).



Graph (1). Index weekly behavior from its birth up to end of 2004.

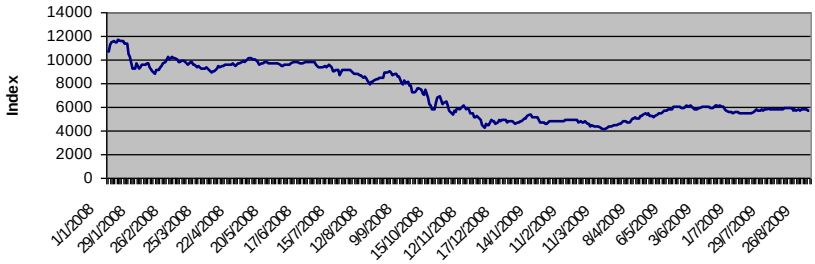
The Saudi stock index started on 28 February 1985 with 1,000 points, only to attain its lowest level ever, 630.41 during the month of September 1986 (a decrease of 37%). It then returned to growth, to reach its highest point 1,182.37 during the month of June 1990 (an increase of 88% from its lowest level). Then it fell again, still above 1,000 points, and remained between 1,000 and 2,000 points for about eight years (1992-2000). It should be noticed that, during this period, most of the well known, international stock markets were thriving at their highest levels (Damir 2005, Shiller, 2005). From the year 2000 onward, the index was drifting up, to surpass 8,000 points by end of 2004. Graph (2) shows the second stage (of the dramatic changes) of the index.



Graph (2). Index daily behavior during 2005, 2006(crisis time), 2007.

As shown in the graph above, the index started again from nearly 8,000 points and was generally increasing, until it reached a peak (20,634.86 points) on the 25th of February 2006. Al-Twaijry (2007) saw that the possible source for this boom was a great number of people starting to invest in the stock market directly or via the portfolios provided by banks. This rise in new investors resulted in a large increase in the demand side for shares. The index fell from the summit, resulting in a tragic stock market crisis, one that had never been happened before. As can be seen from the graph, the index had

been jumping, again to reach by the end of 2006 8,000 points again, we can learn from this, that sharp unjustified increase was mostly followed by a sharp drop off. The index then was almost stable during the year of 2007. Graph (3), however illustrates the third stage (after the dramatic changes) of the index.



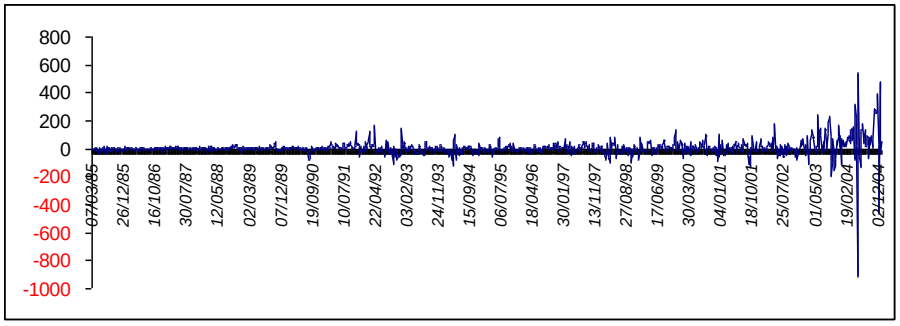
Graph (3). Index daily behavior from beginning of 2008 until now (31-8-2009).

Graph (3) exhibits the index movement during the last 2 years. The index was fluctuating near 10,000 points for the first half of 2008. The general trend during the second half of 2008 was downward to reach its bottom (4,264.52) on the 23rd of November 2008. During 2009, the index behavior was somewhat stable and fluctuated around 5,000 points.

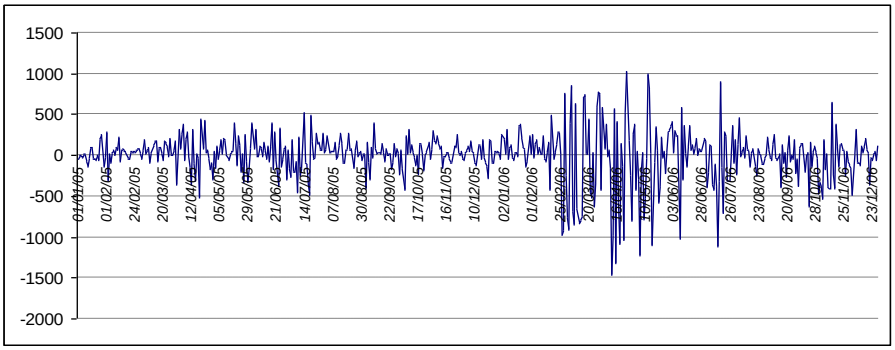
From these graphical analyses, we may conclude that throughout its history, from its birth in 1985, Saudi stock general index has passed two crises. First one, the major one, started and ended in year 2006. Second one started and ended in the first half of 2008.

Return Analysis

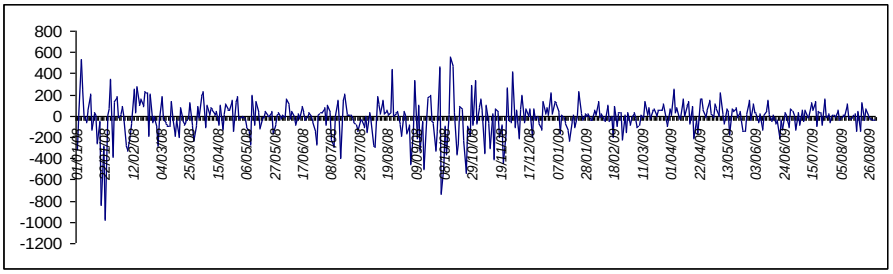
Stock market return is widely used to measure the benefit of holding shares either in the short or the long run. Also stock return can be used to measure stock risk. Throughout Saudi stock history, gross stock market return behavior is explained in the following graphs (4, 5, and 6).



Graph (4). Saudi stock market gross return behavior from 1985 until 2004 (pre crisis).



Graph (5). Saudi stock market gross return behavior during 2005 and 2006 (crisis period).



Graph (6). Saudi stock market gross return behavior during 2008 and 2009 (post crisis).

Stock return volatility was small for the 19 years from 1985 to 2003, and so this period was proper for risk-wary investor. However, as reflected in Graph (5), the volatility of stock return was extremely high during 2005 and 2006. The variance between the highest (over 1,000 p) and the lowest (near -1,500 p) is 2,500. This period was the riskiest time for stock market investors and probably not appropriate for most Saudi investors since Saudi society was classified as a risk-averse society. (Hofstede's 1991; Al-Twaijry, 2007). During the last two years (2008-2009), and except for February and the second half of 2008 (during the second stock crisis), the volatility of the index return was small and ranged between -250 and +250. Statistical tests show that the index' historical weekly and daily returns were not significantly different from zero.

What can be understood form this historical analysis of the periods before, during, and after the crises is that the behavior of the stock prices and returns have changed, that investor behavior has also changed, and that probably investors are now very careful about when, where, and how to invest their money.

Pre and Post Crisis Comparison Analysis

During 2006, the Saudi Stock Market collapsed and the price index lost over 13,000 points (65% of its top level). This was the first time in the entire Saudi stock market history for this to have happened. There was no sudden event leading to this

heavy decline in the share prices. Many things had changed after the crisis, either relating to the regulations or to the business and stock trade. Maybe there are some other things that had not changed. Based on the comparison, we can distinguish between what could be affected and what might not be affected by the crisis and how heavy is the effect using simple figures and advanced models.

It should be noticed that, during 2006, some new rules were applied in the Saudi stock market. One of them was a one to five share split. Consequently, some of the measurements and values cannot be compared and analyzed without removing the effect of the share split. Tables (1 and 2) compare the stock price and stock return across all industries.

Table (1). Stock average prices comparison.

Index	2004 (Before the crisis)		2007 (After the crisis)	
	Mean	Std. Deviation	Mean	Std. Deviation
Banks	13481.01	2721.74	21377.55	2884.97
Industrial	10311.77	2809.82	19226.58	3027.54
Cement	4471.17	454.57	5713.36	485.25
Services	1915.88	322.74	2035.65	184.69
Electricity	2640.06	374.35	1268.40	119.58
Telecom	3046.93	347.87	2706.40	269.48
Insurance	-	-	1832.96	416.60
Agriculture	1940.01	431.68	4102.95	478.15
ALL (General)	6017.92	1071.01	8049.04	983.48

Table (2). Stock Average Return Comparison.

Index	2004 (Before the crisis)		2007 (After the crisis)	
	Mean	Std. Deviation	Mean	Std. Deviation
Banks	33.11	152.54	30.93	1869.17
Industrial	32.51	185.55	50.03	1735.30
Cement	5.01	317.13	5.76	512.37
Services	2.95	40.08	1.00	189.56
Electricity	2.23	73.87	0.51	110.24
Telecom	4.17	49.23	0.74	247.68
Insurance	-	-	3.65	211.72
Agriculture	3.98	60.52	1.43	411.05
ALL (General)	12.66	80.05	12.93	718.00

The mean of the price index of the banking, industrial, and agricultural sectors was much higher after the crisis (80%+) whilst the SD had not significantly changed. Investors probably saw these sectors to be more reliable for investment. Although the general index increased after the crisis by about 1/3, the electricity and telecom indices had decreased with smaller SDs, and this decline may imply that these sectors had been affected more by the crisis than other sectors. By looking at the sector stock return, we can look more deeply into the effect of the crisis on the prices.

From the return mean comparisons, we find that the larger return is within the industrial sector (54%). The stock return in most sectors had heavily declined after the crises (up to over 80%). Furthermore, the SDs had become very large after the crisis compared to before the crisis. These large SDs are a sign of large volatility and

existence of risk. Risk-averse investors should not be happy with this case and might prefer to withdraw from the market while speculators control the market.

Table (3) confirms what was expected above based on SD comparisons. The average number of daily trades had declined by more than 300 (20%). Daily traded stock value decreased from SR 211 million to SR 72 million (by 66%) which may suggest that more people exited from market after the crisis than those who entered it. From this we can say that the crisis has changed investment behavior.

Table (3). Stock Traffic Comparison.

Item	Early 2005 (Before the crisis)		Early 2008 (After the crisis)	
	Mean	Std. Deviation	Mean	Std. Deviation
Trades	1507	2288	1203	1539
Volume	692747	1317172	1512289	3044651
Value	210629043	464378770	71885779	143409784

Table (4). Stock and Company Performance Comparison.

Item	2004 (Before the crisis)		2007 (After the crisis)	
	Mean	Std. Deviation	Mean	Std. Deviation
Dividend per Share	7.56	8.90	8.18	10.77
Earnings per Share	12.19	14.71	16.94	17.11
Book Value per Share	89.81	93.21	88.95	35.20
Return Equity %	11.73	12.34	15.17	13.75
Return on Total Assets %	6.64	8.62	7.71	9.36

Although stock crises are expected to have a strong effect on stock prices and returns, they may have no impact on company performance unless a major portion of the company business and income is associated with investment in the stock market or unless they are related to it. As can be seen in Table (4), The mean of the Saudi stock company dividends per share had increased by 8% after the crisis. The increase in the mean was accompanied by one in the SD. The mean of the earnings per share after the crisis was nearly 40% higher than it was before the crisis. While the mean of the share book value had not changed significantly, its SD had decreased by 60%. By comparing return on equity to return on assets before and after the crisis, we find that the increase in the return on equity was almost double the increase in the return on assets and this might mean that stock companies leverage increased after the crisis.

Table (5). Stock Performance Comparison.

Item	2004 (Before the crisis)		2007 (After the crisis)	
	Mean	Std. Deviation	Mean	Std. Deviation
Dividend Yield in %	1.66	1.60	1.71	1.98
Price to Book value Ratio	4.14	2.30	3.47	1.68
Earning to Price Ratio	0.04	0.04	0.05	0.04

Table (5) suggests that dividend yield Dividend yield had not been much affected by the crisis, but its SD was larger after the crisis. Thus, the dividend yield widened among the stock companies after the crisis. The mean of the share market to book value was 4.14. Therefore, on average, the stock trading price was larger

than its book value by more than four times. However, this ratio decreased after the crisis to be, on average, less than three and a half, a factor associated with a large decrease in the SD. On the other hand, the share-earnings to share-price ratio was, on average, higher (by about 25%) after the crisis. The increased ratio confirms that, in general, the performance of stock companies was better taking into account that share price, in most companies, is higher after the crisis. Although the fact that, in general, stock companies are better of after a crisis in terms of profitability, the results of the crisis in question were that most investors had lost confident in the stock market. On the other hand, these findings may suggest that most share holders in the Saudi stock market either did not know about accounting figures which measure the status of a firm, did not care, or maybe did not believe in them. This situation has led Tadawul and other concerned governmental and private bodies to take more effort in educating the public about how to take the right investment decisions, especially after a crisis.

To examine to what extent can a stock crisis affect the models of finance, economics, and accounting, the three models were estimated using the Saudi stock data before and after the 2006 stock market crisis. The regression results of model one are exhibited in Table (6).

Table (6). Ordinary Least Square Estimation Regression Results of the First Model

Independent Variable	2004 (Before the crisis)	2007 (After the crisis)
Constant (a)	2.941	2.873
	(0.000)	(0.000)
EPS (b1)	0.121	0.029
	(0.000)	(0.801)
DPS (b2)	-0.037	0.303
	(0.490)	(0.104)
R2 (adjusted)	0.41	0.15
	(0.000)	(0.012)

Figures in parentheses reflect the significance.

The constant of the model after the crisis was very close to that before the crisis, and the significance in both is the same. This means that, on average, the price of a share was nearly three times its book value and the crisis had not significantly affected this relation. However, EPS was a significant factor in explaining the change in the price to book value ratio before the crisis, but it became small and insignificant after the crisis. The opposite happened with DPS since its coefficient was small-negative and insignificant before the crisis and changed after the crisis to be positive-high with better significance. From this comparison, it can be inferred that crises make people look at what they get instead of what they expect. In other words, crises make people more concerned about the short run instead of the long run.

From the R^2, it is clear that before the crisis this model was good in explaining the changes in the share prices with their relation to book value. However, after the crisis, the model became much weaker. R^2 reduced from 0.41 to only 0.15 and less significance. This means that, after the crisis, 85% of the changes in the share prices

are related to factors other than the firm performance (EPS and DPS) and thus this model is not always an appropriate measure for predicting stock price changes.

Second model aims to measure the relationship between stock price change in connection with its book value and share daily traffic. Figures in table (7) are the regression results of the estimation of this model.

Table (7). Ordinary Least Square Estimation Regression Results of the Second Model

Independent Variable	Early 2005 (Before the crisis)	Early 2008 (After the crisis)
Constant (a)	-10.366	-7.207
	(0.000)	(0.004)
logTrades (b1)	0.751	1.090
	(0.480)	(0.206)
logVolume (b2)	-5.554	-4.891
	(0.000)	(0.000)
logValue (b3)	5.413	4.797
	(0.000)	0.000
R2 (adjusted)	0.61	0.62
	(0.000)	(0.000)

Figures in parentheses reflect the significance.

By comparing the results of the estimation before and after the 2006 crisis, we find that the model is reliable and only small changes occurred. In both cases, the constant was negative while significant. Although the coefficient of the log number of trades was higher after the crisis, it remained insignificant. Coefficients of log volume and log value are significant at the 1% level in both cases. The relationship between share volume and its price ratio to book value is significantly negative while the relationship between this ratio and share value is significantly positive.

R^2 (adjusted) is almost the same before and after the crisis with the same significance level. This means that, based on the share traffic, at least 60% of the share price changes can be predicted, and there was no significant effect of the stock crisis in this model. This result is consistent with the finding of Al-Twaijry (2007).
The third model has been developed to measure the conservatism principle in accounting. Regression results are presented in tables (8).

Table (8). Ordinary Least Square Estimation Regression Results of the Third Model (using the return on assets variable)

Independent Variable	2004 (Before the crisis)	2007 (After the crisis)
Constant ($\alpha 0$)	0.030	0.030
	(0.000)	(0.000)
D ($\alpha 1$)	-0.028	-0.039
	(0.010)	(0.007)
R/A ($\beta 0$)	0.002	0.002
	(0.000)	(0.000)
D*(R/A) ($\beta 1$)	0.004	-0.002
	(0.007)	0.370
R2 (adjusted)	0.73	0.62
	(0.000)	(0.000)

Figures in parentheses reflect the significance.

The values of the constant and R/A with their significance level are exactly the same before and after the 2006 crisis. Based on this result, we can infer that the magnitude of change in the assets return was exactly the same in both cases. It is evident that the adjusted R^2 in the post-crisis period was lower than it was in the pre-crisis period by more than 10%, indicating a lower explanatory power of the model for the post-crisis period. Although β_0 is exactly the same pre-crisis and post-crisis, β_1 was positive and significant before the crisis and changed to be negative and insignificant after the crisis. This might suggest that conservatism was stronger before the crisis. This inference is consistent with the finding of Warganegara and Vionita (2009). What might be concluded from this comparison is that before and after the crisis, the increase or decrease in share returns did have the same impacts on the standardized net income changes. Going further and examining the model using return on equity instead of return on total assets, we get the regression results presented in Table (9).

Table (9). Ordinary Least Square Estimation Regression Results of the Third Model (using the return on equity variable)

Independent Variable	2004 (Before the crisis)	2007 (After the crisis)
Constant (α0)	0.019	0.013
	(0.000)	(0.009)
D (α1)	-0.014	-0.019
	(0.114)	(0.103)
R/E (β0)	0.002	0.002
	(0.000)	(0.000)
D*(R/E) (β1)	0.003	-0.001
	(0.002)	(0.356)
R2 (adjusted)	0.83	0.79
	(0.000)	(0.000)

Figures in parentheses reflect the significance.

The constant (α_0) was higher pre-crisis and significant in both cases (at the 1% level) whilst α_1 remained insignificant. β_0 and its significance had not changed, suggesting that return on equity has the same power before and after the crisis. Thus, its effect on stock return was not influenced by the crisis. β_1 was positive and significant before the crisis but changed to be negatively insignificant after the crisis. Adjusted R^2 was significantly high in both cases although it was higher before the crisis. When comparing these findings to the estimation when using R/A, we can conclude that the model with R/E is more powerful.

Conclusion

A quarter of a century has passed since the stock price index of the Saudi stock market was initiated in 1985. The number of joint stock companies was about 50 during the 80s and around 90 in the 90's. To date (10-10-2009), the number has reached 135. The stock price index started with 1,000 points and remained, in the following 15 years (from 1985 to 1999), near its original level (with a low near 600

points and highest near 2,200 with an average of about 1,500). Then the index began growing faster until 2003, when it went up sharply and kept rising without major breakdowns to reach its peak (over 20,600) during February 2006. By end of the month of February, a major stock market crisis started, and by May 2006, the index reached 10,000 points and at the end of 2006, the index was below 7,000 points. During 2006, the stock index lost more than 13,000 points (65% of its value). During 2007 and the first half of 2008, the index was almost stable. The second half of 2008 saw another but softer, minor crisis. By end of November 2008, the index reached its lowest level (less than 4,300 points). During this year (2009), the index behavior was fairly stable and fluctuated around 5,000 points.

The stock market index return was nearly stable from the index commencement in 1985 until 2003. The highest return volatility occurred during 2006, ranging between -1500 and +1000. A search for any significant return differences from zero shows no statistically significant differences from zero in the index' historical weekly and daily returns.

The stock indices of banking, industrial, and agricultural sectors were much higher after the 2006 crisis whilst the electricity and telecom indices declined. Although the stock return in most sectors had heavily turned down after the crises (up to over 80%), the stock return of the industrial sector was the reverse. It increased by more than half after the crisis. Furthermore, the SDs were very large after the crisis compared to those before the crisis. This big change in the SDs could be a sign of large volatility and existence of risk. This change in the stock behavior definitely affects large portion of investors, and this was also reflected by the large decrease in the number of daily trades and their values. The performance of stock firms was better after the crisis in terms of earnings. DPS was higher after the crisis, and EPS was even much higher (about 40%). Dividend yield did not change by much but the earnings to price ratio increased by 25%. These findings confirm that, although the performance of the stock companies was better after the crisis, people were not confident enough to remain in the market or to reinvest in stock market shares as they had done before.

To examine to what extent 2006 stock market crisis has affected financial, economical, and accounting theories, three models were developed and estimated using pre-crisis and post-crisis data from the stock market. The first model (a financial theory) was highly affected by the crisis. Values of EPS, DPS, and adjusted R^2 changed significantly after the crisis. For example, R^2 declined from 0.41 to only 0.15, and this means that, after the crisis, 85% of the changes in the share prices are associated with factors other than the performance of the firm. It is clear that the financial model is very sensitive to a stock market crisis. The second model (an economical philosophy) has not been affected by the crisis since the changes were small and insignificant. For example, adjusted R^2 is almost the same before and after the crisis (only a 1% change) with the same significance level. This may confirm that the economic model is not sensitive to a crisis of stock market. The Third Model (an accounting principle) was partially affected by the crisis. The coefficients of R/A and R/E after the crisis are exactly the same as before the crisis. However, the other

independent variables (other than the constant) changed significantly. Although adjusted R^2 decreased after the crisis, it remained high (above 0.60) and significant. Based on that, the Accounting Model can be classified as semi-sensitive to stock market crisis.

We may conclude from the findings of this study that not all the theories hold true all the time. Crises can heavily reduce the value of a theoretical model, but some models can remain trustworthy even after crises. Although the existence of crises, such as financial and stock crises, have caused severe harm to many people and organizations, the academic community should take advantage of the occurrence of crises to test the validity of hypotheses and theories. Adjustments to such hypotheses and theories may be found necessary.

Further studies are needed to examine other theoretical models that might be affected by stock crises. Culture, in particular, in developing nations plays a significant role on the reaction to stock market crises. Since the extent of the effect of stock market and financial crises is strongly influenced by community culture, more studies should focus on the cultural impact on stock market crises and, visa versa, on the impact of stock market crises on the cultures of communities.

References

Al-Rumaihi, J. (1997). Setting Accounting Standards in A Non-Western Environment With Special Reference to Saudi Arabia. *PhD Unpublished Thesis*, University of Dundee.

Al-Twaijry, Abdulrahman A. (2007). Saudi Stock Market Historical View and Crisis Effect: Graphical and Statistical Analysis. *Journal of Human Sciences*, 34(EJ), 1-31.

Areal, N and S. Taylor, (2002). The realized volatility of FTSE-100 futures prices. *The Journal of Futures Markets*, 22(7), 627-648.

Azzam, H. T. (1993), Saudi Arabia: Economic Trends, Business Environment and Opportunities. *Euromoney Books*: London.

Ball, R. and G. Sadka, (2005). Is Accounting Conservatism Due to Debt or Equity Markets? An International Test of "Contracting" and "Value Relevance" *Theories of Accounting*. Working paper, University of Chicago.

Ball, R. and P. Brown, (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research*, 6(2), 159-178.

Ball, R., S. P. Kothari, and A. Robin (2000). The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics*, 29(1), 1–51.

Basu, S. (1997). The Conservatism Principle and the Asymmetric Timeliness of Earnings. *Journal of Accounting and Economics*, 24, 3-37.

Browning, E. and J. Weil, (2002) Burden of Doubt: Stocks take a beating as accounting worries spread Beyond Enron. *Wall Street Journal*, January 30, A1.

Cambell, J. Y. and R. J. Shiller, (1988). Stock prices, earnings and expected dividends. *Journal of Finance*, 43, 661-676.

Cochran, S. and I. Mansur, (2002). Stock market volatility. *Journal of Financial Service Professionals*, 56(1), 82-89.

Crouch, R. L. (1970). The Volume of Transactions and Price Changes on the New York Stock Exchange. *Financial Analyst Journal*, 26, 104-109.

Crouzille, C., L. Lepetit, and A. Tarazi, (2006). Reaction of European Bank Stock Prices to Events of the Asian and Russian Financial Crises. *Revue d'Economie Politique*, 116(4), 457-469.

Damir, T. (2006). Explaining US stock market returns from 1980 to 2005: Implications for the next 25 years. *Journal of Asset Management*, 6(6), 418-432.

Fair, R. (2002). Events that shook the market. *The Journal of Business*, 75(4), 713-731.

Goetzmann W. N. and P. Jorion, (1995). A Longer look at dividend yields. *Journal of Business*, 68(4), 483-529.

Gordon, M. (1959). Dividends, Earnings and Stock Prices. *Review of Economics and Statistics*, 41, 99-105.

Groenewold, N. (2004). Autocorrelation and Volume in the Chinese Stock Market. *Review of Pacific Basin Financial Markets & Policies*, 7(2), 289-309.

Hiemstra, C. and J. Jones, (1995). Testing for linear and nonlinear Granger causality in the stock price-volume relation. *Journal of Finance*, 49(5), 1639–1664.

Hofstede, G. H. (1991). Culture and Organisations. *Harper Collins Publication*, London, UK.

Holthausen, W. and R. Watts, (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting & Economics*. 31, 1-3.

Hung, J. (2009). A Fuzzy Asymmetric GARCH model applied to stock markets. *Information Sciences*, 179(22), 3930-3943.

Lee, B. (2006). An Empirical Evaluation of Behavioral Models Based on Decompositions of Stock Prices. *Journal of Business*, 79(1), 393-427.

Lettau, M. and S. Ludvigson, (2005). Expected returns and expected dividend growth. *Journal of Financial Economics*, 76(3), 583-626.

Liu, Q. (2006). How Good Is Good News? Technology Depth, Book-to-Market Ratio, and Innovative Events. *Journal of Accounting, Auditing & Finance*, 21(3), 293-321.

Mahmood, W. and M. Ali (2007). Interdependence Among the Asian Pacific Stock Market During the Asian Financial Crisis. *Journal of Applied Economics*, 6(5), 22-34.

Nguyen, D. and M. Bellalah, (2008). Stock market liberalization, structural breaks and dynamic changes in emerging market volatility. *Review of Accounting and Finance*, 7(4), 396–411.

Patev, P., N. Kanaryan, and K Lyroudi, (2006). Stock market crises and portfolio diversification in Central and Eastern Europe. *Managerial Finance*, 32(5), 415–432.

Ray, B. and R. Tsay, (2000). Long-range dependence in daily stock volatilities. *Journal of Business & Economic Statistics*, 18(2), 254-262.

Sabri, N. (2004). Stock Return Volatility and Market Crisis In Emerging Economies. *Review of Accounting and Finance*, 3(3), 59–83.

Shiller, R. J. (2005). Irrational Exuberance. *New Jersey*, USA.

Siklos, P. (2008). The Fed's reaction to the stock market during the great depression: Fact or artifact? *Explorations in Economic History*, 45(2), 164-184.

Silvapulle, P. and J. Choi, (1999). Testing for linear and nonlinear Granger causality in the stock price-volume relation: Korean evidence. *Quarterly Review of Economics and Finance*, 39(1), 59–76.

Smirlock, M. and Laura Starks. (1985). A Further Examination of Stock Price Changes and Transaction Volume. *Journal of Financial Research*, 8, 217-225.

Sterling, R. (1970). The Theory of the Measurement of Enterprise Income, *Lawrence, KS*: University of Kansas Press.

Vo, X and K. Daly (2005) International Financial Integration: An Empirical Investigation into Asian Equity Markets Pre-and Post-1997 Asian Financial Crisis. *Asian Pacific Financial Markets in Comparative Perspective*: Issues and Implications for the 21st Century, 86, 75-100.

Warganegara, D and V. Vionita, (2009). An Empirical Investigation on the Extent of Conditional Conservatism: Evidence from Indonesia. *1st Annual Conference World Accounting Frontiers Series (WAFS)*, Macau, China.

Watts, R. (2003). Conservatism in Accounting Part I: Explanations and Implications. *Accounting Horizons*, 17(3), 207-221.

Zhou, W. and D. Sornette, (2009). A case study of speculative financial bubbles in the South African stock market 2003–2006. *Physica*, A, 388(6), 869-880.

أزمات الأسهم وسلوك السوق: حالة سوق الأسهم السعودية

عبدالرحمن علي التويجري

أستاذ، قسم المحاسبة. كلية الاقتصاد والإدارة – جامعة القصيم

(قُدم للنشر في ٢٠٠٩/١/٣م، وقبل للنشر في ٢٠٠٩/٩/٢٣م)

ملخص البحث. عمر سوق الأسهم السعودي يزيد عن ٢٥ سنة، ومنذ ولادتها في عام ١٩٨٥ وحتى عام ٢٠٠٥، لم تشهد السوق انهيار ذو أثر. ومع ذلك، وخلال السنوات القليلة الماضية (٢٠٠٦ – ٢٠٠٩)، فقد شهدت سوق الأسهم أزمتين حادتين: الأولى موجعة والثانية موهنة. الغرض من هذا البحث هو تحديد أثر انهيار الأسهم عام ٢٠٠٦ على سلوك سوق الأسهم, ودراسة تأثيرها على أسعار الأسهم وعوائدها وذلك من خلال ثلاثة نماذج (مالية واقتصادية ومحاسبية). نتائج المقارنة والانحدار الإحصائي تشير إلى أن انهيار الأسهم عام ٢٠٠٦ لم يغير من سلوك السوق بعد الأزمة. لقد تأثر النموذج المالي بشكل جوهري من جراء الأزمة (R^{2} Adj انخفض من ٠,٤١ إلى ٠,١٥ بعد الأزمة)، في حين كان تأثر النموذج الاقتصادي طفيفاً (R^{2} Adj كان ٠,٦١ قبل الأزمة و ٠,٦٢ بعدها). النموذج المحاسبي كذلك طرأ علية بعض التغير الغير جوهري جراء أزمة ٢٠٠٦. على الرغم من أن قوة النموذج قد ضعفت بعد الأزمة، إلا أنها ظلت مرتفعة وجوهرية.

الكلمات المفتاحية: انهيار سوق الأسهم السعودي, أسعار الأسهم, عوائد الأسهم, الانحدار الإحصائي, نموذج.