The Impact of Global Financial Crisis 2008 on Amman Stock Exchange

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Abstract

The effect of the September 2008 global financial crisis weighed heavily on stock markets around the world. The purpose of this study is to empirically investigate the impact of the crisis on Amman Stock Exchange. Event study methodology has been adopted on a period of 24 months, from January 2008 to December 2009. Monthly average abnormal returns across a sample of 52 industrial and services companies have been tested separately. The results reveal that Amman Stock Exchange experienced significant negative abnormal returns in the fourth quarter of the year 2008. However, there were no significant abnormal returns observed thereafter. This means that Amman Stock Exchange managed to overcome its adverse consequences. Since the event study tests for market efficiency, as well, the results show that Amman Stock Exchange reaction is consistent with the semi-strong form of the efficient market hypothesis.

Keywords : Global Financial Crisis (GFC), Amman Stock Exchange (ASE), Event Study, Efficient Market Hypothesis (EMH).

JEL Classifications : G01, G14, G18

Ⅰ. Introduction

The global financial crisis (GFC) of autumn 2008 began as a local problem in a segment of the U.S housing market, *i.e.* "subprime mortgage crisis", then rapidly spread across the world and escalated to affect both financial systemsand economic activities in many regions and countries and resulted in a recession worldwide.

The year 2008 was a disastrous year for most of the international stock exchanges with losses exceeding a 40%. World index (MSCI AC) fell by 43.5%. Arab Monetary Fund composite index declined

by 54.6% (ASE, 2010).

Jordan is less fortunate with natural resources and the Jordanian emerging economy remains very much an economy of services. As for ASE, it was affected in a limited manner. Statistics shows that the price index weighted by free float shares decreased by 24.9% in 2008 and by 8.2% in 2009 (ASE, 2010).

This study will attempt to assess the impact of GFCon the ASE and examine whether there had been any significant negative abnormal reaction in the market around the crisis event. That is by examining the behaviour of the ASE around the eruption of the financial crisis. As a joint hypotheses event test, some conclusions about the market efficiency will be drawn. It is worthwhile to investigate whether its financial market is more vulnerable to the financial shock that hit the world. As there is a few, if none, empirical literature examined the impact of GFC on the Jordanian. Therefore, this study tries to fill the gap in the literature related to the impact of the GFC on an emerging market. In addition, this study contributes to the crisis literature in two aspects: Firstly, by using the event study methodology, and, secondly, by providing a direct test of the market efficiency. The results of the study are expected to reveal the extent of which an emerging market is able to withstand a major external financial shock such as the GFC. Moreover, the study provides investors with some evidence on the investment opportunities around a period of financial crisis.

The remainder of the study will be organized as follows: Section two provides a theoretical background and literature review on financial crises. Section three describes the data and introduces the methodology while section four analyzes and discusses the results. Finally, section five concludes the findings.

Ⅱ. Theoretical Background and Literature Review

The purpose of this section is to provide an overview on what is a financial crisis, its indicators, types, causes and channels of transmission, and finally a historical background on the major financial crises.

Early history of finance literature, as Charles P. Kindle Berger (1903), showed thatthe cyclical nature of the free-market economy constituted of several phases, one of which is the "crisis" that occurs when the economic prosperity reached its height. This phenomenon can be explained by relying on the analysis of Keynes: the financial instability is inherent in the free-market economy because the prices of financial assets in the market are not determined in the same way as the prices of common goods (Aglietta, 2008). In a broad sense, a financial crisis is a disturbance to financial markets that disrupts the market's capacity to allocate capital: financial intermediation and

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hence investments come to a halt (Portes, 1999). There are many interacted causes of financial crisis, such as (1) strategic complementarities in financial markets (Bullow, Geanakoplos & Klemprer, 1985), (2) leverage, borrowing to finance investments (AIMA, 2006), (3) asset-liability mismatches (Diamond and Dybvig, 2000), (4) regulatory failures (Strauss-Kahn, 2008) and (5) contagion (Dungey and Tambakis, 2003).

One of the main features of the financial crises is their tendency to spread cross countries via mechanisms such as (1) capital flows (ESCWA, 2009), and seizing-up of the internationalcredit markets (Boorman, 2009), (2) trade (ESCWA, 2009), (3) employees' remittances (Willem te Veldi, 2008), (4) tourism and (5) aids budgets declines (Spence, 2009). Markwat, Kole & Dijk (2009) examined whether the evolution of crashes can be characterized as a "domino effect", in which local emerging market crashes evolve into more severe regional or global crashes. They found convincing empirical evidence for the presence of a domino effect. This holds for all different types of crashes. They also found evidence for interdependence between stock markets and other asset markets. Bond markets'returns, interest rate levels and stock market volatility are important determinants of local, regional and global crashes while currency changes are not. Patel and Sarkar (1998) investigated nine stock market crashes and the extent of contagion during crises. They found similar results.

There are many faces of financial crises. These are: (1) banking crisis (Ergungor and Thomson, 2005) and credit crunch, which explains the GFC and the crisis of Dot-Com bubble in 2000 (Aglietta, 2008), (2) speculative bubbles and crashes and (3) currency crisis (Krznar, 2004).

Historically, international financial markets have experienced several episodes of distress. The Great Depression of 1930s, which began U.S in 1928 and lasted until 1932, was the longest and most severe economic depression ever experienced by the industrialized western world. It resulted in a loss of credibility in Adam Smith classical theory of liberalism and the emergence of the Keynesian theory which emphasize the necessity of government intervention in the economic activity.

The **1987** stock market crash refers to Monday, October 19th 1987 (**Black Monday**), when the U.S equity market suffered its largest single-day percentage decline in history. It was a major systemic shock (McKeon and Netter, 2009). Yang and Bessler (2008) investigated financial contagion among seven international stock markets around Black Monday crash, and provided positive evidence for stock market contagion during abnormal market times.

The period 1986 to 1990 was a speculative bubble period in Japan. Equity prices rose more than 600% and land prices boomed more than 400%, combined with more money in banks and relatively low interest rates, loans and credits became easier to obtain.

The Japanese Asset Price Bubble collapsed at the beginning of 1990. The subsequent decade has been termed the "lost decade".

In the early 1990s, the Mexican economy seemed healthy. The Mexican government devalued the Peso and the **Mexican Peso Crisis of 1994** had begun. The main cause was the large scale of the current account deficit, where it rose to about 8% of Mexican GDP (Whitt Jr., 1996). By devaluating its currency, Mexico initiated "The Tequila Effect". It hits the stock markets of Latin America, and spel-

led over to Poland, Turkey, South Korea, Taiwan and Hong Kong (Zarazaga, 1999). Mathur, Gleasor, Dibooglu & Singh (2002) examined the contagion effects of the Mexican Peso crisis on Chilean stock market and providedevidence of contagion effects and spell over.

The **Asian financial crisis** started in July 2nd 1997 with the financial system collapse of the Thai Baht currency resulting in a recession in most south East Asian countries (Garay, 2003).

Liberalization, distortion in the allocation of resources and weakness in the financial system are all contributed to the crisis (Climent and Meneu, 2003). Nagayasu (2000) analyzed the crisis on Philippines and Thailand and found that contagion effects running from Thailand to the Philippines were identified and the Thai banking sector became a channel to transfer volatility through the stock index to the Philippine Peso. Climent and Meneu (2003) studied the relationships between seven Southeast Asian markets and three international ones. They found no multi variate co-integration relationships across markets. Goh, Wong & Kok (2005) assessed the linkages across the stock markets of five Asian countries before, during and after the crisis and showed that most of the stock markets experienced positive average daily returns in the pre-crisis period, but turned negative during the period of crisis. Then returns hover around zero level. Cheung, Cheung & Ng (2007) studied the interactions between the U.S and four East Asian markets and investigated the impact of Japanese currency movements on these markets. The results documented that the information structure during the crisis was different from that in the non-crisis periods. The U.S index led the East Asian market indices before, during and after the crisis. On the other hand, the influence of these East Asian markets on the U.S was found during the crisis. Most interestingly, the results confirmed the effect of the Japanese currency on these equity markets during the crisis period, but not in the post-crisis. Similarly, Wang and Lee (2009) investigated the spillover effects and channels during the crisis of nine Asian countries. The findings suggested that the spillover effects of the stock returns and volatilities were larger during the high fluctuations period compared to the low fluctuations period.

The **1998** financial crisis in **Russia** started in August 17th 1998 when the government abandoned its defence strong Rubble due to fiscal imbalances. The government financed much of its budget deficit by issuing treasury bills (GKOs) and bonds (Cooper, 1999). Dungey, Fry, Gonzalez-Hermosillo & Martin (2007) examined the effects of the Russian bond default and the Long Term Capital Management twin crises on four developed markets and six emerging markets from three different regions. The key result was that contagion is significant and widespread to a variety of international equity markets during the Long Term Capital Management crisis, with the effects of contagion being strongest on the industrial markets and the geographically close Latin American markets. Saleem (2009) examined the transmission of the Russian crisis across U.S, EU, East Europe and Asia and found evidence of direct linkage between Russian equity market, both in regards of returns and volatility, with all other markets, however the linkage is weak.

The period 1998-2000 was a speculative **Dot-Come Bubble** period, marked by an emerging group of new internet-based companies, commonly referred to as "Dot-Com", that were selling products or services

using the internet. The Dot-Com peaked in the end of the 1990s and created a stock market bubble. The bubble burst on March 10th 2000.

The 2008 crisis, triggered by the bursting of the U.S real estate bubble, is considered as one of the most serious global financial meltdowns.

The crisis started in the mid of 2007 with the US subprime mortgage crisis, triggered by a dramatic rise in mortgage delinquencies and foreclosures (Brunnermieir, 2009). Although some bankruptcies were caused in 2007 and early 2008, the crisis effectively erupted and hit its peak during September 15th 2008 when several American financial institutions became insolvent and defaulted on their payments (Bose, 2008).

The GFC can be traced back to the lax monetary policy adopted by the Federal Reserve (Dabrowski, 2008), lowering federal funds rate target and interest rates, loans of various types were easy to obtain (Bernanke, 2005), expand mortgage loans to those who were not eligible for prime loans (Diamond, 2008), government deregulation, self-regulation of Wall Street's investment banks and the failed regulation of Wall Street rating agencies (Bernanke, 2009).

The crisis represents the first and most difficult challenge to the globalization process. Anaraki (2009) investigates the long-run relationship between the European and U.S stock market indices. The co-integration analysis suggests that the two markets are integrated and there exists a long term relationship between them. The Granger causality test indicates that the causality runs from the U.S to European stock market. Cheung, Fung & Tam (2008) measure the degree of interdependence between equity markets in the Executives' Meeting of East Asia Pacific Central Banks region and the U.S. Their findings suggested that the degree of interdependence between the equity markets in that region and the U.S and across the regional markets has increased steadily since 2006, and risen sharply following the collapse of Lehman Brothers in September 2008. However, the results did not provide evidence of contagion between the markets in that region and the U.S during the recent turmoil.

Economic activity and merchandise trade plummeted across all markets and continued to fall rapidly. Developing countries suffered from plummeting commodity prices; drop in demand for exports and lower remittances and foreign capital inflows. Gklezakou and Mylonakis (2009) examined the relationship among South Eastern Europe and Germany as a leading European stock market, before and during the GFC. The results suggested that these markets, which were loosely related in periods of normal economic activity, exhibited strong inter-relationships under conditions of economic recession and that Germany exerted dominant influence on their developing counter parties.

The direct impact of the crisis on Arab countries had been limited to fallen prices of primary goods (Rivlin, 2009). The Arab banking sector has not been highly affected, mainly because of limited integration into global financial markets. However, they become cautious in their lending decisions, and some countries were experiencing credit dry up (Kouame, 2009). The impact of the GFC on Arab stock markets was visible in countries with strong links to global financial markets. Sovereign wealth funds in the region have suffered great losses as a result of the crisis. The construction sector, particularly the real estate of the United Arab Emirates, had been hit badly by the GFC. In the service sector, a significant decrease has occurred in demand for international travel and tourism, affecting particularly Jordan, Egypt, Lebanon, Tunisia and Morocco. Workers' remittances have also declined, putting a huge impact on those countries which depend on remittances as a source of foreign exchange such as Jordan, Egypt, Yemen, Lebanon and Syria. Foreign direct investment inflows to the Arab region started to drop in 2008 and further declined in 2009 (Saif, 2009).

Lagoarde-Segot and Lucey (2005) investigated vulnerability of the financial contagion in a set of rapidly expanding emerging markets of the Middle East and North Africa, during seven episodes of financial crises. The hypothesis of joint regional contagion was significantly rejected. Finally, Ajlouni (2011) investigated the Jordanian policy response to the GFC and concluded that the waves of the global financial crisis Tsunami hadbeen passed on to the Jordanian economy through three distinct ways, namely: the workers' remittances, government aids and grants, and foreign direct investments. The other significant channel of impact was the slump in business and consumer confidence leading to decrease in investment and consumption demand. To boost the demand, the Jordanian government has announced several stimulus packages. The study an alyzed the past trends and policy measures to assess the possible implications for economic recovery and long run growth in the Jordanian context.

The above review shows that previous literatures have investigated the impact of the GFC, but none of which examined the effect of the crisis on the Jordanian stock exchange. Hence, this study adds value to the literature by filling the gap.

Ⅲ. Data and Methodology

The population of the study includes all public share holding companies listed in ASE first and second markets for the period January 2006 to December 2009. The sample of the study is drawn from the industrial and the services sectors. As a result, the sample of this study is composed of 52 companies: (22) service companies and (30) industrial companies. The data consists of monthly stock closing prices for the sample companies, obtained from ASE Bulletins and Reports.

The event study methodology of Fama, Jensen, Fisher & Roll (1969) has been adopted in this study. The Event Study time line consists of estimation period and event window, as in figure (1).
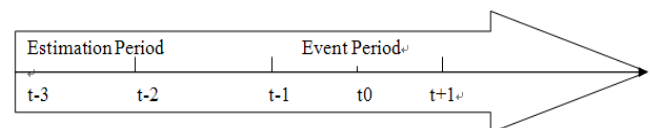
Where t0 denotes the event date, the period from t-1 to t+1 represents the event window and the period from t-3 to t-2 constitutes the estimation window (MacKinlay, 1997). The period from t-2 to t-1 is an isolation period, which isolates the estimation period from event period.

<Figure 1> Time Line for an Event Study

In this study, the event date (t0) is September 15th, 2008. The estimation period is the pre-crisis period (from t-32=January 2006 to t-9=December 2007) and the event window is the crisis period (from t-8=January 2008 to t+15=December 2009). So, for each security in the sample, a maximum of 48 monthly returns are used around the event, starting at month (-32) and ending at month (+15).

The major concern in event studies is to assess the extent to which security price performance around the time of the event has been abnormal. Abnormal returns (ARs) are defined as the difference between the observed returns over the event window and the expected returns during the event window if there had been no event (Ajlouni and Toms, 2008). The actual return for each security (i) in the month (t) is computed as follows:

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} \tag{1}$$

Where R_{it} is the actual (observed) return of security (i) in month (t) P_{it} is the closing price of security (i) in month (t) and P_{it-1} is the last closing price of security (i) in month (t).

A model of normal returns must be specified before an (AR) can be calculated, using the Constant Mean Return Model (Saidane and Lavergne, 2008). The model relates the return of any given security to its average return over the estimation period. The expected return is supposed constant over the event window. The model assumes that asset returns are given by:

$$R_{it} = \overline{R}_i + e_{it} \tag{2}$$

Where R_{it} denotes the return on security (i) at month (t) $\overline{R}_i$ is the mean returns of security (i) over the estimation period; e_{it} is the time period (t) disturbance (error) term for security (i) with an expectation of zero mean and variance $\sigma^2(e_{it})$.

The models parameters ($\overline{R}_i$ and e_{it}) are classically computed using data over the estimation period. After estimating the normal performance model parameters, the abnormal returns can be calculated over the event window as follows:

$$AR_{it} = R_{it} - \overline{R}_i \tag{3}$$

To draw overall inferences for the event of interest, the (AR) observations are aggregated through time and across securities. By averaging the (ARs) across firms in a common event time, the sample average abnormal return (AAR) for period (t) is given by:

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_{it} \tag{4}$$

Where (N) is the number of securities in the sample and (t) refers to period in the event window.

The periodic average abnormal returns can be aggregated over the event window to obtain the cumulative average abnormal return (CAAR), as follows:

$$CAAR\ (t-1, t+1) = \sum_{t-1}^{t+1} AAR_t \tag{5}$$

According to Brown and Warner (1985), the basis for inference in event studies is a test statistic, which shows whether the abnormal performance measure is significantly different from zero at a certain, a priori specified, significance level. The test statistic for any month (t) is given by:

$$t-calculated = \frac{AAR_t}{\sigma_{AARt}} \tag{6}$$

The standard deviation is estimated from the time-series of mean excess returns (AARt) as follows:

$$\sigma_{ARR_t} = \sqrt{\frac{1}{23} \sum_{t=-8}^{t=+15} (ARR_t - \overline{AAR})^2} \tag{7}$$

$$\overline{AAR} = \frac{1}{24} \sum_{t=-8}^{t=+15} AAR_t \tag{8}$$

Under the null hypothesis of no abnormal returns, the distribution of the t- statistic is student-twith (n-2) degrees of freedom, where (n) is the number of periods in the event window.

IV. Results and Discussion

The GFC and economic slowdown that occurred during the second half of the year 2008, led the world economy to fall into a state of great confusion and distress with heavy consequences for financial markets worldwide (Orozco and Lesaca, 2009). The impact of the GFC on Jordan has been minor compared to other Arab countries, thanks to sound economic management and prudent supervision and regulation of the country's financial sector. Indeed, the Jordanian banking sector stayed in a safe and a sound financial position, mainly because of limited integration into global financial markets and less exposure to the U.S subprime mortgages and the financial products related to those mortgages. However, as a very open economy with strong trade links with the region and the rest of the world, the Kingdom has been more or less affected by the global and regional economic slowdown (Ajlouni, 2011). Therefore, it is expected that ASE to react negatively to such financial crisis.

The major contribution of this study is that it is among the first to examine the impact of GFC on an emerging market, i.e. ASE. Most of previous literature emphasized on the effect of GFC on the economic policies and variables. Therefore, this study is directed to test whether the GFC resulted in negative abnormal returns in the ASE at the event month and the months surrounding the event.

Firstly, we start by making a comparison between the monthly actual returns mean for each company in the sample over the estimation period (the pre-crisis period) and the event period (the crisis period); and determine whether there is a significant difference between

the average values under both periods. Table (1) provides the monthly actual returns means for each company in the sample during the estimation and event periods, their averages across the sample and the mean difference for the pair.

<Table 1> Actual Returns Means for Each Company in the Sample during the Estimation Period and the Event Period

Company	Actual Returns Mean in the Estimation Period	Actual Returns Mean in the Event Period	Mean Difference
1) ABMS	-0.0264	-0.0029	0.0235
2) AIEI	-0.0131	-0.0171	-0.004
3) AIFE	0.0051	-0.0121	-0.0172
4) ZEIC	-0.0027	-0.0031	-0.0004
5) ZARA	-0.0008	-0.0137	-0.0129
6) MERM	-0.0148	-0.0167	-0.0019
7) MALL	-0.0016	0.001	0.0026
8) SITT	-0.0255	-0.0174	0.0081
9) NAQL	0.0061	-0.0235	-0.0296
10) SHIP	-0.0258	-0.0005	0.0253
11) JETT	-0.0136	-0.0045	0.0091
12) ALFA	-0.0133	0.0231	0.0364
13) PRES	0.0059	-0.0092	-0.0151
14) JOPP	0.0104	-0.0334	-0.0438
15) JOEP	0.0034	0.0066	0.0032
16) JOPT	0.0162	0.0102	-0.006
17) ABLA	0.0101	0.0653	0.0552
18) BIND	0.0405	-0.0072	-0.0477
19) DKHS	-0.0375	0.007	0.0445
20) SIJC	0.0412	0.0149	-0.0263
21) JITC	0.0627	-0.0339	-0.0966
22) SPTI	0.0192	0.0107	-0.0085
23) DADI	-0.0117	-0.0079	0.0038
24) JPHM	-0.0095	-0.0081	0.0014
25) MPHA	0.0211	0.0069	-0.0142
26) NATC	-0.0204	-0.0081	0.0123
27) INOH	0.0354	0.0193	-0.0161
28) JOIC	-0.0066	-0.0072	-0.0006
29) ACDT	-0.0142	-0.0399	-0.0257
30) UMIC	-0.0044	-0.003	0.0014
31) UCVO	0.0378	0.0187	-0.0191
32) FNVO	-0.0057	0.0115	0.0172
33) ITCC	-0.0071	0.0018	0.0089
34) UTOB	-0.034	-0.0094	0.0246
35) APOT	0.0499	0.0159	-0.034
36) JOPH	0.0573	0.0484	-0.0089
37) JOCM	0.0014	-0.0137	-0.0151
38) JOST	-0.0145	0.0053	0.0198
39) NATA	-0.0071	-0.0218	-0.0147
40) AALU	-0.0019	-0.0085	-0.0066
41) TRAV	-0.0153	-0.0091	0.0062
42) AQRM	-0.0461	-0.0226	0.0235
43) ASPMM	-0.0154	0.0166	0.032
44) JOPI	0.0176	-0.0228	-0.0404
45) JNCC	-0.0079	-0.0619	-0.054
46) WIRE	0.0041	-0.0304	-0.0345
47) AEIN	-0.0165	-0.0228	-0.0063
48) JOWM	-0.0244	-0.0152	0.0092
49) ELZA	-0.0042	-0.0356	-0.0314
50) CEIG	0.0047	-0.0356	-0.0403
51) JOCF	-0.0273	0.0011	0.0284
52) ICER	0.0046	-0.0276	-0.0322
Average	-0.0003	-0.0062	-0.0059

Table (1) shows that the average difference between the actual returns means in the event period and that in the estimation period equals to -0.0059. A paired samples t-test is performed to assess whether the difference is significantly different from zero. We have checked for normality using the Kolmogorov-Smirnov test. Using the SPSS, the results of the paired samples t-test are shown in Table (2).

<Table 2> Paired Samples Statistics and Test of the Average Difference between the Actual Returns Means in the Event Period and Actual Returns Means in the Estimation Period

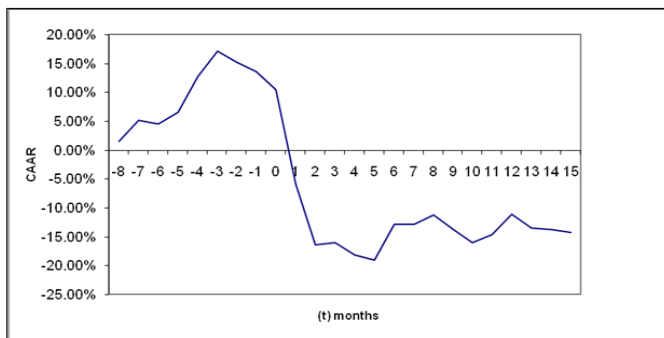| Paired Samples Statistics		Mean	N	Std. Deviation	Std. Error Mean		
Pair 1	Event	-.0062	52	.02166	.00300		
	Estimation	-.0003	52	.02359	.00327		
Paired Samples Test		Paired Differences					
		Mean	Std. Devia-tion	Std. Error Mean	95% Confidence Interval of the Difference	t-stat	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	event − estimation	-.00591	.02747	.00381	-.01356	.00173	-1.552	51	.127

Table (2) shows that the difference is insignificant. Consequently, there was no significant decline in ASE during the crisis period as compared to the pre-crisis period.

However, this result has to be confirmed or otherwise by the event study methodology. Table (3) presents the average abnormal returns (AAR_t) for each month (t) in the event window and the cumulative average abnormal returns (CAAR) over the event window, which is computed by aggregating the monthly average abnormal returns (AAR_t) over the event period from January 2008 up to December 2009.

<Table 3> The Event Window Monthly Average Abnormal Returns (AAR_t) and the Cumulative Average Abnormal Returns (CAAR)

Months	(t)	AAR_t	$CAAR_t$
January 2008	-8	1.55%	1.55%
February 2008	-7	3.68%	5.23%
March 2008	-6	-0.71%	4.52%
April 2008	-5	2.04%	6.56%
May 2008	-4	6.22%	12.78%
June 2008	-3	4.40%	17.18%
July 2008	-2	-1.92%	15.26%
August 2008	-1	-1.65%	13.61%
September 2008	0	-3.09%	10.52%
October 2008	+1	-16.26%	-5.74%
November 2008	+2	-10.55%	-16.29%
December 2008	+3	0.32%	-15.97%
January 2009	+4	-2.17%	-18.14%
February 2009	+5	-0.85%	-18.99%
March 2009	+6	6.23%	-12.76%
April 2009	+7	-0.05%	-12.81%
May 2009	+8	1.65%	-11.16%
June 2009	+9	-2.48%	-13.64%
July 2009	+10	-2.32%	-15.96%
August 2009	+11	1.37%	-14.59%
September 2009	+12	3.53%	-11.06%
October 2009	+13	-2.35%	-13.41%
November 2009	+14	-0.30%	-13.71%
December 2009	+15	-0.55%	-14.26%

Figure (2) shows the graphical development of the (CAAR) during the 24-months event window. The abnormal performance of the ASE can be categorized into two phases. In effect, the (CAAR) navigated in positive territories during the first six months of the year 2008 reaching its peak in June 2008. Then reversed its trend in the second half of the year 2008 plunging into negative territory from October 2008, as the eruption of the GFC adversely affected the overall market sentiment , registering the largest negative (CAARs) in the last quarter of 2008 and early 2009. In the months after, the (CAAR) slightly increased to stay relatively stable for the rest of the event period.

<Figure 2> The Graphical Development of the (CAAR) over the Event Window

To check the validity of these results, each event month average abnormal return (AAR$_t$) tested separately. Table (4) provides the results of the test-statistic for the average abnormal returns during the event window.

<Table 4> The Average Abnormal Returns (AARt) and the T-Test Values

Months	(t)	AAR$_t$	T-Values (AAR$_t$ / S$_{AARt}$)
January 2008	-8	0.0155	0.316
February 2008	-7	0.0368	0.7506
March 2008	-6	-0.0071	-0.1456
April 2008	-5	0.0204	0.4161
May 2008	-4	0.0622	1.2697
June 2008	-3	0.044	0.8987
July 2008	-2	-0.0192	-0.3919
August 2008	-1	-0.0165	-0.3362
September 2008	+0	-0.0309	-0.6315
October 2008	+1	-0.1626	-3.3197*
November 2008	+2	-0.1055	-2.1526*
December 2008	+3	0.0032	0.0651
January 2009	+4	-0.0217	-0.4427
February 2009	+5	0.0085	-0.1726
March 2009	+6	0.0623	1.2719
April 2009	+7	-0.0005	-0.0111
May 2009	+8	0.0165	0.337
June 2009	+9	-0.0248	-0.5062
July 2009	+10	-0.0232	-0.473
August 2009	+11	0.0137	0.2787
September 2009	+12	0.0353	0.7213
October 2009	+13	-0.0235	-0.4802
November 2009	+14	-0.003	-0.0605
December 2009	+15	-0.0055	-0.1127

*Significant at 5% level of significance.

The results in table (4) do not show significant negative abnormal reaction during pre-crisis period (from t-8 to t-3) as most of AARs are small and positive. In spite of the appearance of the first signs of a GFCin the western world, there was no question of alarm in ASE since the Jordanian financial system had little exposure to those toxic assets which triggered the crisis. Indeed, ASE had gained 30% in the first half of 2008. Trading activity in the market overall was strong, supported by the high liquidity in the market, evident in the levels of trading volume and value. Companies were reporting record profits resulting in a positive sentiment in the market, reflected in the performance of a number of stocks. The industrial sector, specifically the mining and extraction sector, was the main driving force behind ASE upward trend due to the substantial share price appreciation of some blue ship companies operating in the sector, due to the large increase of prices of raw materials worldwide in early 2008, such as phosphate, potash and steel. This helped those companies to generate higher profits. Moreover, utilities and energy sector performed well due to the increased market activity surrounding Jordan Electric Power and Jordan Petroleum Refinery.

The crisis period experienced negative average abnormal returns. However, the average abnormal returns in the two months preceding the GFC, (t-2 and t-1) and at the event-date (t0), are too small and statistically insignificant. Only two parameters are statistically significant: the average abnormal return in the month (t+1) and (t+2). The market dropped sharply during the two months following the eruption of the GFC and started to manifest its adverse repercussions across the globe. ASE declined by 40.5% during the second half of 2008. The crisis impact became visible in the fourth quarter of 2008 where the sharpest drop in stock returns occurred. ASE experienced a 32% decline during the last quarter of 2008 (ASE, 2010).

As a result of the drop in global inflation levels stimulated by the recession and evident in the sharp fall in global commodity prices such as oil, steel and potash; some industrial blue ship companies saw their share prices plummet in the fourth quarter. The mining sector dropped by 44.15% in the last quarter alone. The services sector was not an exception to the downward trend, especially the transportation and the energy sectors, when its index declined by 17.7% by the end of 2008 (ASE, 2010). However, the impact was relatively contained. In addition, the bearish trend that governed the regional and the international markets after mid-2008 largely affected investors'sentiment in Jordan triggering a wave of sell-offs in the market. This fact was further enhanced by some companies'negative disclosures which suffered from undervalued inventories due to the drop in prices of commodities. This led investors to lose their confidence in ASE due to uncertainty concerning the future direction of the market, leading liquidity to evaporate.

Moreover, the slump in oil prices played a vital role in the poor performance of ASE during the last quarter of 2008. The Jordanian capital market is directly correlated and affected by the economic position and capital markets performance of the GCC countries, key investors into Jordan. The decline in oil prices that began in 2008 led excess liquidity to evaporate in the Gulf region resulting in a deterioration in the foreign direct investments' to the Kingdom, as well as the value of remittances from Jordanians working abroad, drawing

away the ample liquidity that had been pumped into the Jordanian capital market in previous years. Adding to that, the Jordanian banks became increasingly risk averse in their lending. This negatively affected the level of liquidity available in the market. However, despite the huge plunge in companies shares prices following the onset of the GFC, especially in the last quarter of 2008, reflected in the ASE's index decline by 25% by the end of 2008 (ASE, 2010).

During the post-crisis period (t+4 to t+15), the monthly average abnormal returns fluctuate between positive and negative values. However, no significant negative average abnormal return has been observable over this period. However, the impact of the GFC continued into 2009. ASE extended its decline in 2009 registering an 11.6% fall in the ASE relative to 2008. The total trading value amounted to JD 9.7 billion by end 2009 plummeting by 52.4% relative to the previous year (ASE, 2010). In spite of the liquidity shortage effects on the trading volumes and its performance indicators, ASE has been able to overcome these effects to a large extent. In fact, this can be attributed to the trustworthiness of the Jordanian capital market and investors' confidence given the legislative and organizational frameworks that enhance the protection of the capital market on all levels.

In addition, the government post-crisis measures and stimulus package aiming at improving domestic liquidity, partially contributed to alleviate the adverse effects of the GFC. Given the slowdown in the allocation of bank credit to the private sector, the Central Bank of Jordan lowered the re-discount rate from 6.25% in 2008 to 4.75% in 2009. The weighted average interest rates on credit facilities extended in the form of loans and advances decreased by the end of 2009 to 9.1% compared with 9.5% at the end of 2008 (ASE, 2010). At the sector level, the services sector index increased by 4.1% due to the increase in most of the leading companies'shares prices, especially the utilities and energy sector. Moreover, the industrial sector index raised by 0.10% due to the increase in the mining and extraction shares prices. The tobacco and cigarettes, utilities and energy, chemical industries, transportation, mining and extraction industries, commercial services, pharmaceutical and medical industries and technology and communication sectors were the most advanced sectors during the year 2009 (ASE, 2010).

Event studies provide a direct test of the Efficient Market Hypothesis (Ajlouni and Toms, 2008). The main idea of the theory is that stock market, i.e. investors, reacts to new information immediately. If there is any lag in the response of prices to an event, it is short lived. Abnormal returns should not exist for a long time. If prices respond to new information in a rapid fashion, the market is relatively efficient; otherwise the market is relatively inefficient. Fama (1970) distinguished three forms of market efficiency. Under each, different types of information are assumed to be reflected in securities prices: The weak form of the efficient market hypothesis indicates that stock prices are assumed to reflect any information that may be contained in the past history of the stock price itself. The semi-strong form presumes that all publicly available information is presumed to be reflected in securities prices. Finally, the strong form takes the notion of market efficiency to the ultimate extreme. All information is reflected in stock prices. This includes private or inside information as well as that which is publicly available. Fama (1991) outlines that the Random Walk Hypothesis to test the first level; event study for the second; and Multivariate Analysis, in addition to the event study, for the third.

The empirical results revealed that before the announcement of the onset of the GFC, no significant negative abnormal average abnormal returns have been observable in ASE. This means that the occurrence of a GFC was not anticipated by the market. At the event month (t0), no significant negative average abnormal returns have been noticed in the ASE. This behavior violates the Efficient Market Hypothesis, since ASE did not adjust immediately to reflect the effect of the GFC. This indicates that the information announced at month (0) was of no value for the Jordanian investors, who perceived the event of the GFC as having no significant impact on the Jordanian economy. Significant negative average abnormal returns have been experienced in the two months (October and November 2008) following the event month (September). ASE reacted to the financial crisis event as the crisis intensified and its adverse effects began to be visible all over the globe. Hence, ASE can be said relatively efficient or at least consistent with the semi-strong efficient hypothesis since, it rapidly reacted to the GFC, in a laps of time of two months following the announcement and then any abnormal performance has been shown by the market for the rest of months in the event window.

V. Conclusions

Various literatures have investigated the impact of the GFC, and carried out in developed countries. None of which, however, examined the effect of the crisis on the Jordanian stock exchange. This study investigated the impact of the GFC of 2008 on ASE, one of the most important capital markets in the region, using event study methodology. Carrying out a paired sample t-test on the negative mean difference between the event period average actual returns and the estimation period average actual returns, it was found that the difference is statistically insignificant. However, carrying out the test-statistic as described by Brown and Warner (1985) on ASE monthly average abnormal returns over a 24-months event window, the results show that there is no significant abnormal reaction in ASE during the first six months of the year 2008. Most of the average abnormal returns are small and positive, leading to conclude that ASE has not been affected by the GFC. However, the average abnormal returns in the two months preceding the GFC and the event month are negative but statistically insignificant. While the two months following the onset of the GFC show statistically significant negative average abnormal returns. This support the hypothesis that the GFC negatively affected stock exchanges returns. Last, no significant negative average abnormal returns have been noticed during the year of 2009. This is consistent with the hypothesis that the GFC has limited impact on the ASE.

The event study makes an extraordinary opportunity to test the efficiency of the ASE. The study finds that the ASE reacts negatively to the announcement of the GFC. However, the reaction is not immediate on month (t0) but delayed to month (t+1) and extended to

month (t+2) after the announcement of the event. It took ASE a short time to capture the greatest part of the event impact on the market value. This behavior indicates that the ASE is not perfectly efficient but at least semi-strongly efficient.

In the light of the results of the study, it can be concluded that the GFC had a limited impact on ASE and the latter was less vulnerable to its adverse effects. This is because the Jordanian financial system had little exposure to global finance and consequently to the toxic assets. The negative impact of the financial crisis on the ASE can be attributed mainly to the psychological factor, where the bearish trend that governed the international and the regional markets after mid-2008 largely affected investor's sentiment and led to a loss of confidence in ASE. The drop in the global inflation levels stimulated by the global recession reflects in the sharp fall of the share price of some ASE leading stocks. Moreover, as key investors into Jordan, the sharp drop in global oil prices had reduced excess liquidity in the GCC countries which reached the ASE through foreign investment as well as remittances. So there is evidence of regional contagion given the strong financial and economic links between Jordan and GCC countries. Finally, the cautious behavior of the Jordanian banks toward the lending activity led the liquidity to evaporate in the ASE.

Although ASE is one of the oldest and most important markets in the region, it received little research concerning the impact of the GFC on its performance. Therefore, it is recommended that further researches extend the current study by investigating the matter from different angles, such as efficiency, volume and volatility; and methodologies, such as non-parametric tests. Such varied views might represent limitations on this study's findings.

As for the foreign investors, they are recommended to pay more interest in investing in ASE since it is considered as one of the safest and the most important financial market in the Middle East region. It managed to overcome and withstand the adverse effects of the financial crisis. ASE maintained a solid performance since the beginning of the GFC until the end of 2009, as compared with most of the Arab markets.

Moreover, the stable political domestic environment and the legislative and organizational frameworks that enhance the protection of the capital market on all levels result in a strong trustworthiness of the Jordanian capital market.

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