Stock Market Reaction to Catastrophic Shock: Evidence from Pakistani Listed Companies

Attiya Y. Javid

- News of major events takes no time to impact the stock prices.

- Event studies attempt to assess the extent to which stock markets' performance stray's from the normal around the time of the occurrence of the events

Examples

- mergers and acquisitions, earning announcement, issue of new debt or equity.
- announcements of macroeconomic variables such as trade deficit
- In law and economics to measure the impact on the value of the firm due to the change in the regularity environment
- Market crash in the USA of October 1987 and related crash in the Far East later in January 1998 led to several studies of the event to examine the institutional and structural factors that were inherent in the trading strategies of investors.
- Natural disasters have been studied, Hurricane Andrew and for Oct 17, 1989 California earthquake . Such studies two opposite effects on insurance firm value: a negative effect due to payment of policyholders' claim and a positive effect due to expectations of higher premium.

Objective

- To analyze effect of unanticipated event of earthquake of Oct 8, 2005 on the activities of KSE
- Three indicators
- average return
- volume
- volatility,

MM-with-GARCH

- We used the market model to estimate the price behavior.
- Since return distribution are time varying in nature we extended it to generalized autoregressive heteroscedasticity (GARCH) model.
- The return generating process of financial time series are also important therefore ARMA specification is include

GARCH is Suitable Model

- The instability in stock markets introduced by some shocks usually initiates a spell of fluctuations.

- The volatility clusters generated by any shock are not made of shocks in the same direction.; the period of volatility would include negative as well as positive changes, reflecting 'technical correction' and reaction to delayed information respectively.

- Therefore the inertia in volatility causes autocorrelation in random fluctuations and the GARCH equation that captures this inertia is a simple ARMA process in squared residuals and variances.

Empirical Specification

- MM-with-GARCH

$$r_{it} = \beta_{0t} + \beta_{mt} r_{mt} + \sum_{i=1}^{p} \alpha_i r_{t-i} + \sum_{j=0}^{q} \beta_j \varepsilon_{t-j} + \varepsilon_t$$

$$\varepsilon_t = v_t \sqrt{h_t}$$

$$h_t = \phi_0 + \sum_{k=1}^{l} \phi_k \varepsilon_{t-k}^2 + \sum_{m=1}^{s} \lambda_m h_{t-m}$$

Data

- Sixty firms are selected which are listed on KSE comprising 90% of market capitalization for Jan 2005 to Dec 2006.
- selection Criteria
- continuous listing on exchange
- representative of almost all the important sectors
- high turnover in their particular sector.
- Website of business recorder, annual reports

Empirical Findings

- The first step of estimation is to calculate the daily stock returns

- a positive relation between stock return and market return as shown by market β.

- presence of a significant autoregressive process of first order .

- ARCH (1) and GARCH (1) and found to be present at 1% significance level

Extended Model

- estimate the series of GARCH variances
- Volume equation has ARMA specification
- An event dummy is defined, the value of dummy (D=0) is defined as period before the earth quake and (D=1) afterwards

$$r_{it} = \beta_{0t} + \beta_{mt}r_{mt} + \beta_D D + \sum_{i=1}^{p}\alpha_i r_{t-i} + \sum_{j=0}^{q}\beta_j \varepsilon_{t-j} + \varepsilon_t$$

$$h_t = \phi_0 + \phi_D D + \sum_{k=1}^{l}\phi_k \varepsilon_{t-k}^2 + \sum_{m=1}^{s}\lambda_m h_{t-m}$$

$$V_{it} = \gamma_0 + \gamma_D D + \sum_{i=1}^{p}\theta_i V_{t-i} + \sum_{j=0}^{q}\delta_j \varepsilon_{t-j} + \varepsilon_t$$

Empirical Findings

- The results indicate that earthquake has adverse affect on daily return of AICL, ASKB, BOP, MCB, NBP, OGDC, PMI, PSO, PTCL and SHELL. This shock has positive effect on SSGC, LUCK, FCCL, ULEVER, and INDU. The earthquake resulted in the increase in trade volume of AICL, ASKB, FCCL, MCB, PICIC, PMI, SIEM, SSGC but it negatively affected the traded volume of SHELL, PSO, PTCL and OGDC, ABOT.

Empirical Findings

- These results have interesting interpretation the increase in the return and volume of cement, and banking sector indicates that individual has expectation for the upcoming demand of investment in these sectors. Furthermore there is no significant increase in the volatility because the individuals were seemed certain about the future outlook. These expectations are formed in the backdrop of generally held perception that Pakistan will receive response in the form of foreign aid and to some extent these expectations turn out to be true. This evidence suggests that the Karachi Stock Market is responsive to unanticipated events and it takes no time to show this response.

Conclusion

- The implication which comes out of this study is that one can argue that the reaction of stock market to this natural disaster was not unexpected with any directions in any sense; it is consistent with the expectations of investors, policy maker, regulatory bodies, media and common people