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Evolution of Market Uncertainty around Earnings Announcements

Authors:
Dušan ISAKOV - University of Geneva and FAME
Christophe PERIGNON - HEC-University of Geneva and FAME

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Abstract:
This paper investigates theoretically and empirically the dynamics of the implied volatility (or implied standard deviation - ISD) around earnings announcements dates. The volatility implied by option prices can be interpreted as the level of volatility expected by the market over the remaining life of the option. We propose a theoretical framework for the evolution of the ISD that takes into account two well-known features of the instantaneous volatility: volatility clustering and the leverage effect. In this context, the ISD should decrease after an earnings announcement but the post-announcement ISD path depends on the content of the earnings announcement: good news or bad news. An empirical investigation is conducted on the Swiss market over the period 1989-1998.

Executive Summary:
Alternative statistical methods are available to estimate the volatility of stock returns. The majority of them reflects the past evolution of the market as they are based on historical data.

The only forward-looking measure of market uncertainty can be obtained from derivative markets by computing the implied standard deviation (ISD) from option prices. Technically, the ISD is the volatility parameter which makes the option price obtained from a theoretical option pricing model equal to the option price observed on the market. This paper focuses on the behaviour of the implied volatility around earnings announcements and provides new results about the way market participants' perceptions of future volatility change around this event.

The theoretical model of the evolution of uncertainty builds on the work of Merton (1973), who states that the implied volatility represents the average instantaneous volatility until the expiration of the option if the instantaneous volatility is a deterministic function of time. This property is particularly interesting as it means that the behaviour of the implied volatility around earnings announcement dates depends on the expectations of market participants concerning the evolution of the instantaneous volatility until the expiration of the option. The standard model of the evolution of ISD assumes that the instantaneous volatility is constant except on the disclosure date, where it rises because of the uncertainty linked to the content of the announcement. This assumption implies that the pattern that should be observed in terms of implied volatilities is a rise before the announcement date, a peak on the day before the announcement and a fall to its long-term level on the disclosure date. We modify the framework by taking into account two well-known features of the instantaneous volatility: volatility clustering and the leverage effect. Volatility clustering can be defined as the presence of autocorrelation in volatility. It means that a day of high (or low) volatility is very likely to be followed by a day of high (or low) volatility. The leverage effect was first expounded by Black (1976) and relates to the way the instantaneous volatility reacts to past news. To be more precise, the volatility has been shown to increase more after a negative shock (bad news) than after a positive shock (good news). These two features imply that the evolution of ISD around earnings announcements should be slightly different. The evolution of ISD before the disclosure date is unchanged but, after the announcement, the patern may be different. The ISD should not drop sharply to its long-term level on the announcement day.

Moreover after a bad news the ISD should be higher than after a good news. The evolution of the ISD is also investigated empirically over the period January 1989-May 1998 using daily data from the Swiss stock and option markets. We computed the ISD 10 days before and after earnings announcement dates for 17 firms. The final sample contains 178 announcement of annual and semi-annual results. The empirical results indicate that on average it takes 4 days to the ISD to reach its long term level which is in favour of the volatility clustering hypothesis. The leverage effect is also investigated by dividing the sample in two different subsamples: the good news and the bad news. Two partition criteria are used to determine the subsamples. The first one is the abnormal return on the announcement date, i.e. the return of the stock minus the return on the market. The second is the earnings surprise, i.e. the difference between the realized earnings and the earnings that have been forecasted by financial analysts. For both measures we use a 0% breakpoint to discriminate between good and bad news. The empirical results indicate that, after a negative abnormal returns, the ISD is slightly higher than after a good news. This result is in favour of the leverage effect assumption. When using earnings surprises we find no difference in the evolution of the ISD. This means that this partition criteria does not capture the same type of information as abnormal returns. As the variation of ISD are relatively small (about 1%), we suspect that any trading strategy based on these results would not be profitable.

INTERNATIONAL CENTER FOR FINANCIAL ASSET MANAGEMENT AND ENGINEERING
40 bd du Pont d'Arve • P.O. Box 3 • CH-1211 Geneva 4 • tel +41 22 /312 0961 • fax +41 22 /312 1026
http://www.fame.ch • e-mail: admin@fame.ch