Kara Franchesca Chupungco AMANTOY

QF302 Investment and Financial Data Analysis

Event Study

**1. INTRODUCTION**

**1.1 Objectives of the Study**

The null hypothesis of many event studies is that the event of interest has no material effect on the share price of a company. In this study, we investigate the announcement impact of downside earnings surprise, that is, earnings announced are lower than consensus earnings. We wish to see if negative earnings announcements convey information to investors, and hence have a negative impact on the market’s valuation of the firm’s equity. A secondary objective of this study is to see how insights gained from behavior of abnormal returns can affect existing trading strategies. The paper ends with a summary of findings and recommendations on how investors can capture through the findings of this event study.

**1.2 Description of Dataset**

The event of interest is the downside earnings surprise. The event day is the announcement day of company earnings. In order to make the event study meaningful, we focus our sample on negative earnings surprises wherein manager guidance is in line with the market’s expectation of downside earnings. The source of the dataset is the Center for Research in Security Prices (CRSP), a provider of historical stock market data and is part of the Booth School of Business at the University of Chicago.

We examine 50 stocks from the U.S. stock market. The listing of the announcement dates, the company name, ticker symbol, actual earnings and consensus earnings can be found in the appendix. The study will focus on the quarterly earnings announcement of the 50 firms from the period September 2009 and August 2012 to September 2012. The dates were carefully chosen to neutralize any bias that may have been caused by differences in years and market condition.

However, one limitation of the study is the difficulty to control for other biases. Nonsynchronous trading effect, or the effect of recording prices during different intervals and times of the day, may induce biases in the moments of that stock return. Other issues include event date uncertainty. This can occur when earnings are announced through different channels such as conference calls, on newspapers or electronically. This can then lead to ambiguity of announcement date.

**1.3 Methodology**

The event window in this study is the 10 days before and after day 0, the announcement date. The periods prior to and after the event are also of interest. We can examine the efficiency of the market in digesting the information content of the earnings announcement. We can also investigate the temporal effects of the announcement of company earnings.

Following MacKinlay (1997), abnormal return of an event involving a company is defined as

.

We utilize the market model in setting the benchmark of which to compare abnormal returns. Ordinary least squares (OLS) estimates are used for the market model coefficients. The dataset for the OLS regression include to , totaling 240 data points. For more information on the market model and abnormal returns, one can refer to *Event Studies in Economics and Finance* by MacKinlay A. from the Journal of Economic Literature.

**2. DATASET DESCRIPTIVES & EMPIRICAL RESULTS**

This section presents the results of the study. We look at the abnormal return (AR), average abnormal return (AAR), cumulative abnormal return (CAR) and finally, cumulative average abnormal return (CAAR). Through AR and CAR, we observe the behavior of individual stocks and see if any patterns arise from the behavior of certain stocks against others. We then look at AAR and CAAR to make generalizations about the behavior of stock before and after the announcement date.

**2.1 Abnormal Return**

We get abnormal return through the formula described above and test for its significance. The null hypothesis of the test is that the abnormal return is equal to 0 or H0: AR = 0. If the null hypothesis is rejected, we can say that the downside earnings announcement has a material effect on the share price. We can then continue to investigate the implications of our findings in the next section.

Figure 2.1 AR

Figure 2.2 t-statistics for AR



The graphs seen above show the AR and test statistic for AR for each day of each stock in the event window. As we can see, most stocks experienced a sharp decline in AR on the event day. AR fell as much as 30% on This was followed by an equivalent rise on .

Some stocks experienced positive jumps in price in the days leading up to the event date. To make generalizations about stock behavior leading up to and after the event day, we can refer to the average abnormal returns (AAR), which will be discussed in the next section. Information leakage does not seem to have been a problem at this point of time as most of the stocks had consistent volatility in abnormal returns in the days leading up to the announcement.

What is interesting to note is that two stocks had positive AR on the announcement day: KAR Auction Services (KAR) and Joy Global (JOY).

KAR Auction Services operates complete auction solutions in North America. Actual earnings announced where 0.26 while consensus earnings were at 0.27. However, stock analyst reports on August 6, 2012, the KAR announcement day, all cite that the 0.26 actual earnings were a 12% increase from a last quarter. It also reported that KAR has a P/E ratio of 15.00 compared to the industry ratio of 7.20. This can indirectly explain the otherwise positive performance of the KAR stock despite a downward earnings surprise.

On the other hand, Joy Global is a worldwide leader in high-productivity mining solutions. The consensus earnings were 1.9. Actual earnings per share announced were 1.82. However, many stock analysts saw Joy Global as a buy as it was outperforming its peers, with stock price up by 31.46% from the past year, compared to the industry average of -9%.

We can also look at the stocks with the sharpest declines and the biggest gains and check for patterns and common themes. As we see below, there seems to be no clear trend among the companies with the highest and lower t-statistics for AR. Two out of the five companies with the lowest tstatAR are from Energy while four out of the five companies with the highest tstatAR are from Industrial and Electronics. These companies are seen to be more stable than compared to Energy companies. The market capitalization, the average volume trade and the percent difference between actual earnings and consensus earnings show no discernable pattern or difference in the two sets of companies shown below.

**Lowest tstatAR on**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| SYM | tstatAR | Company Name | Industry | Market Cap. | Average Vol. | diff |
| AHII | -259.73 | Animal Health International Inc. | Health | 103.40M | 9,557 | 108% |
| KSWS | -231.73 | K Swiss Inc. | Textile | 38.08B | 255,000 | 83% |
| TE | -171.14 | Teco Energy | Energy | 17.42B | 1,462,000 | 6% |
| SOL | -145.38 | ReneSola Ltd. | Energy | 115.65M | 1,026,000 | 18% |
| BLT | -128.55 | Blount International | Industrial | 648.8M | 499,000 | 13% |

**Highest tstatAR on**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| SYM | tstatAR | Company Name | Industry | Market Cap. | Average Vol. | diff |
| SPRD | 109.82 | Spreadtrum Communications | Industrial | 968.94M | 1,046,000 | 9% |
| MFLX | 53.034 | Multi-Fineline Electronix, Inc. | Electronics | 375.01M | 69,000 | 6% |
| CEC | 8.23 | CEC Entertainment | Consumer | 577.05M | 111,000 | 36% |
| SNE | 7.22 | Sony Corporation | Electronics | 17.06B | 3,525,000 | 509% |
| DE | -8.99 | Deere & Company | Industrial | 32.7B | 3,174,00 | 15% |

**2.2 Average Abnormal Return**

In this section, we look at the average abnormal return of all 50 stocks over the event window and their corresponding t-statistics. We can also make generalizations about the behavior of the abnormal return of stocks before and after the announcement date. The AAR reported in the table below reflect the abnormal return behavior of the majority of stocks as seen earlier. The null hypothesis that the AR at time period is rejected and hence we can infer that AR on that day was signficantly different from zero. The abnormal return on all other days in the event window cannot be considered significant.

|  |  |  |  |
| --- | --- | --- | --- |
| Period | AAR | Test Statistic | Inference |
|  | -0.00338 | -0.57004 | Do not reject |
|  | -0.00716 | -1.20941 | Do not reject |
|  | 0.00361 | 0.60971 | Do not reject |
|  | -0.00341 | -0.57582 | Do not reject |
|  | -0.00195 | -0.32956 | Do not reject |
|  | -0.00143 | -0.24142 | Do not reject |
|  | 0.00208 | 0.35069 | Do not reject |
|  | 0.00450 | 0.75922 | Do not reject |
|  | 0.00113 | 0.19068 | Do not reject |
|  | 0.00388 | 0.65447 | Do not reject |
|  | -0.11894 | -20.08809 | **Reject** |
|  | 0.00635 | 1.07284 | Do not reject |
|  | 0.00687 | 1.16040 | Do not reject |
|  | 0.00108 | 0.18246 | Do not reject |
|  | -0.00046 | -0.07736 | Do not reject |
|  | 0.00228 | 0.38541 | Do not reject |
|  | -0.00104 | -0.17573 | Do not reject |
|  | 0.00122 | 0.20596 | Do not reject |
|  | 0.00466 | 0.78762 | Do not reject |
|  | 0.00436 | 0.73598 | Do not reject |
|  | 0.00246 | 0.41578 | Do not reject |

Figure 2.4 t-statistics for AAR

Figure 2.3 AAR



The graphs above indicate a slight rise in AAR before the drop in abnormal return during the announcement date. AAR then bounces back up with an equivalent magnitude. This confirms the material effect of the announcement on the share price of the company.

Two things that can be noted in the above graph is the temporal effect of the downward earnings surprise and the AAR before and after the event date. We can see that the announcement impact is temporary or transitory. AR reverses completely after the event date. However, in order to truly determine the lasting impact of the downward earnings surprise, an examination of the cumulative abnormal return is necessary. This will be discussed in the next section. It can also be observed that AAR rises slightly on the day before the earnings announcement. One possible explanation of this phenomenon is that investors were looking to short the stock in view of the expected drop in price.

**2.3 Cumulative Abnormal Return**

We now look at the cumulative abnormal return (CAR). In this section, we can further investigate the temporal effects of the earnings announcement. If CAR returns to its original state immediately after the event date, we can say that the announce impact is only temporary or transitory. If CAR does not return to its original state immediately after the event date, we can say that the announce impact has permanent effect on the asset value. Similarly, if we see that CAR shifts towards either end gradually, we can also discuss the speed of which information is disseminated among investors and the efficiency of the market.

Figure 2.5 CAR

Figure 2.6 t-statistics for CAR



As we can see in the graph above, the CAR of some stocks decline and stay low while others revert back to the original levels. The companies with the lowest CAR at the end of the 10-day event window is Big Lots, Inc (BIG), a discount retailer, Orbitz Worldwide, Inc. (OWW), an online travel company, Pulse Electronics (PULS), an electronic components manufacturer, Cross Country Healthcare (CCRN), a critical care nursing company and QLT Inc. (QLTI), a pharmaceuticals company.

However, the CAR of majority of stock returns appears to rise gradually after the steep decline on the announcement day. With the exception of the stocks listed earlier, most CAR slowly drift upwards, although not at the same level as it originally was.

**2.4 Cumulative Average Abnormal Return**

In this section, we further discuss the generalized temporal effects of a downward earnings surprise. We have seen in the earlier sections that some stocks tend to revert to their original level of cumulative abnormal return, albeit gradually. Some stocks were harder hit than others, while a few were able to recover speedily. We look at the table below and observe that the CAAR is significantly different from zero only up to the 4th day after the event date. The succeeding test-statistics are then considered insignificant, with CAAR rising gradually.

|  |  |  |  |
| --- | --- | --- | --- |
| Period | CAAR | Test Statistic | Inference |
|  | -0.00338 | -0.122448105 | Do not reject |
|  | -0.01054 | -0.321422933 | Do not reject |
|  | -0.00693 | -0.190922327 | Do not reject |
|  | -0.01034 | -0.265135261 | Do not reject |
|  | -0.01229 | -0.29809043 | Do not reject |
|  | -0.01372 | -0.317943074 | Do not reject |
|  | -0.01164 | -0.259610927 | Do not reject |
|  | -0.00714 | -0.154116179 | Do not reject |
|  | -0.00602 | -0.125996194 | Do not reject |
|  | -0.00214 | -0.043663709 | Do not reject |
|  | -0.12108 | -2.412046126 | **Reject** |
|  | -0.11473 | -2.236324513 | **Reject** |
|  | -0.10786 | -2.060747495 | **Reject** |
|  | -0.10678 | -2.002656968 | **Reject** |
|  | -0.10724 | -1.976854377 | **Reject** |
|  | -0.10496 | -1.903819733 | Do not reject |
|  | -0.10600 | -1.89377261 | Do not reject |
|  | -0.10478 | -1.845424422 | Do not reject |
|  | -0.10011 | -1.739611876 | Do not reject |
|  | -0.09576 | -1.642688508 | Do not reject |
|  | -0.09329 | -1.581052534 | Do not reject |

Figure 2.8 t-statistics for CAAR

Figure 2.7 CAAR



According to Bernard & Thomas (1989), “post-earnings-announcement drift (PEAD) is the tendency for a stock’s cumulative abnormal return to drift in the direction of an earnings surprise for several weeks (even several months) following an earnings announcement.” Applying this to the event study, we expect to see abnormal returns to drift downwards following the downward earnings surprise. However, that is not the case here. We see that immediately after the announcement has been made, return drops significantly but slowly drifts upward in the next 10 days. If PEAD was taken to be true, prices should be drifting downward not upward.

Bernard & Thomas (1989) attributed the PEAD phenomenon to investor under-reaction to earnings announcements and slow speed that information content of the earnings announcement is digested by investors and is incorporated into the efficient market price. As their paper ‘Post-Earnings-Announcement Drift: Delayed Price Response or Risk Premium?’ was published more than 20 years ago, one can assume that the external environment of the stock market has changed dramatically. The reaction of the market has been captured and observed even on the same day as the announcement. In fact, as we see the prices slowly move upwards again, we can even say that investors over-reacted to the earnings announcement and prices are increasing in order to correct for a more efficient market price.

However, in order to make a conclusive stand on the PEAD phenomenon and the behavior of cumulative abnormal return of stocks after the announcement date, a longer event window extending beyond the 10 days after the earnings announcement used here is necessary. This is to fully observe the long-term drift that the stock has, as suggested by Bernard & Thomas (1989).

**3. IMPLICATIONS & CONCLUSION**

**3.1 Implications on Strategy**

As we have seen in the graphs of AR, CAR, AAR and CAAR, majority of stocks tend to exhibit a certain behavior after a downward earnings surprise. AR declines tremendously on the announcement date but reverts back on the next trading day. CAR, on the other hand, declines on the announcement date but gradually drifts upward to its original level, with CAR significantly different from zero only up to the 4th day. These findings have numerous implications on trading strategy.

Firstly, investors that trade with the post-earnings announcement drift in mind, such as those employing momentum investing, should be cautioned. The empirical results of this event study show that the market overreacts on the announcement day of companies with lower than expected earnings. Returns generally drop during the announcement day and drift upward rather than downward. Investors can capitalize on this finding by buying stock with downward earnings surprise and sell on the 4th day after, when cumulative abnormal returns are gradually returning to their original levels.

Another implication of these findings is that the stock of companies in certain industries may behave differently in reacting to downward earnings surprise. As seen in the section analyzing AR of the different companies, returns of companies in the Industrial and Electronics industry have been seen to be more stable than those in the Energy industry. However, this trading strategy recommendation necessitates more research with a wider range of industries and companies in the sample, as well as a more variables for comparison.

**3.2 Conclusion & Summary**

All in all, this event study has shown and analyzed the behavior of returns of stock of companies that report earnings lower than expected in an individual stock level, a generalized stock level and throughout a 10-day event window. There is a material effect on returns that is seen immediately after the earnings announcement. On a general level, abnormal return reverts to its original on the immediate trading day after the announcement day. On the other hand, a similar drop is seen in cumulative abnormal return but cumulative average abnormal return only reverts to its original level after the 4th day. With these findings, implications on trading strategies were also discussed, along with recommendations on areas for further research and investigation.

**References:**

1. MacKinlay, A. Craig. 1997. Event studies in economics and finance. *Journal of Economic Literature*, 35, 13–39.
2. Campbell, J. Y., Lo, A. W., & MacKinlay, A. C. (1997). *The econometrics of financial markets*. Princeton, N.J: Princeton University Press.
3. Afego, P. (2011). *Stock price response to earnings announcements: Evidence from the nigerian stock market*. (Master's thesis), Available from Munich Personal RePEc Archive. (33931) Retrieved from <http://mpra.ub.uni-muenchen.de/33931/>
4. Iqbal, J., & Farooqi, F. (2011). *Stock price reaction to earnings announcement: the case of an emerging market*. (Master's thesis), Available from Munich Personal RePEc Archive. (30865) Retrieved from <http://mpra.ub.uni-muenchen.de/30865/>
5. Odabasi, A. (1998). Security returns’ reactions to earnings announcements: A case study on the istanbul stock exchange. *Bogazici Journal: Review of Social, Economic and Administrative Studies*, *12*(2), 3-19. Retrieved from <http://hamlin.cc.boun.edu.tr/~odabasi/research/Event-Study-97.pdf>
6. Ganguli, Santanu K., *EMH and post-earning announcement drift: An insight from event study of turnaround companies in India* (February 1, 2010). Available at SSRN: <http://ssrn.com/abstract=1545647> or <http://dx.doi.org/10.2139/ssrn.1545647>
7. Bernard, V. L., & Thomas, J. K. (1989). Post-Earnings-Announcement Drift: Delayed Price Response or Risk Premium*? Journal of Accounting Research*, 27, 1-36.
8. *After-hours earnings report for august 6, 2012 : Bxp, vno, chk, bap, mr, oas, kar, bkd, nrp, wrc, mtw, brs*. (2012, Aug 06). Retrieved from Read more: <http://www.nasdaq.com/article/afterhours-earnings-report-for-august-6-2012-bxp-vno-chk-bap-mr-oas-kar-bkd-nrp-wrc-mtw-brs-cm161620>
9. Drumelis, V. (2012, Aug 23). *Earnings preview: Joy global reports q3 results august 29*. Retrieved from <http://seekingalpha.com/article/825231-earnings-preview-joy-global-reports-q3-results-august-29>