<Chapter 12 Event Arbitrage>

Event arbitrage : trading on the market movements surrounding news announcements

12.1 Developing event arbitrage trading strategies

<Developing event arbitrage>

1. Identify dates and times of past events in historical data
2. Compute historical price changes at desired frequencies using historical data
3. Estimate expected price based on historical data

12.2 What constitutes an event?

- Magnitude of an event can be measured as a deviation of the realized event figures from the expectations of the event. (all events do not have the same magnitude.)
- Several theories to determine "Unexpected change"
  1) Frenkel and Edwards(1982) : out-of-sample error based on the one-step-ahead autoregressive forecasts (lagged data와 관련(autoregressive)하다...)
     - ➔ Most macroeconomic news develops slowly over time, so trends are observed during past several months or quarters.
     - ➔ Unexpected components of news : difference between news released and expectation based on autoregressive analysis
     - ➔ The impact of autoregressive is best seen in shorter terms. (But the persistence is different among types of news

12.3 Forecasting Methodologies

1) **Directional Forecasts**

- Sign test : does the security under consideration consistently move up or down in response to announcements of a certain kind?

➔ Estimate whether a persistently positive and negative sign of the response to a specific event existed

➔ Estimate whether the response is statistically significant

- Mackinlay(1997)

■ $H_0 : p \leq 0.5,\ H_1 : p > 0.5$

➔ Null hypothesis : event does not cause consistent behavior in the price of interest

➔ Alternative hypothesis : 〃 does cause consistent behavior 〃

■ N : total number of events

N^+ : number of events that were accompanied by positive return under consideration

■ $(1-\alpha)$: $event\ with\ statistical\ confidence$

If the asymptotic test statistic $\theta > \Phi^{-1}(\alpha)$, where $\theta = \left[\frac{N^+}{N} - 0.5\right]\frac{\sqrt{N}}{0.5} \sim N(0,1)$

- "Event Window" : the time period from the announcement to the end of the trading opportunity

2) **Point Forecasts**

- Whereas directional forecasts provide insight about **direction and trends**,
- **"Point Forecasts"** estimate the future value of price in equilibrium following an announcement.
- **Event Studies :** measurement of the quantitative impact of announcement on the return

1. Record dates, times, price traded before and after the events, "surprise" changes, and categorize events, capture quotes and trades at high frequencies.

➔ Contents of Surprise changes

◆ Difference between realized value and prediction based on autoregressive analysis

◆ Difference between realized value and analyst forecast consensus

2. Calculate returns corresponding to the times of interest surrounding the announcement.

3. Simple linear regression

$$R_t = \alpha + \beta \Delta R_{m,t} + \varepsilon_t$$

(R_t : $the\ vector\ of\ returns\ surrounding\ the\ announcement$)

(ΔX_t : $the\ vector\ of$ "surprise" $changes\ in\ announcement$)

■ 'Changes in equity prices to account for the impact of broader market influences'(R_t^a) measured by **Sharpe market model(1964)**

$$R_t^a = R_t - \hat{R}_t$$

($\hat{R}_t$: $expected\ equity\ return\ estimated\ over\ historical\ data\ using\ market\ model$:

"$R_t = \alpha + \beta R_{m,t} + \varepsilon_t$" $\rightarrow CAPM$)

12.4 Tradable News

- Corporate News

  : Unexpected components make price change.

  Expected Equity Price

$$Equity\ Price = \sum_{t=1}^{\infty} \frac{\mathrm{E}[Earnings_t]}{(1 + R_t)^t}$$

- *Unexpected component of announcement*

  = announce value – the mean or median economists' forecast (consensus)

12.5 Application of Event Arbitrage

- Anderson-Bollerslev-Diebold-Vega use consensus forecasts as the expected value for **estimation of surprise component of news** announcement

$$R_t = \beta_0 + \sum_{i=1}^{I} \beta_i R_{t-i} + \sum_{k=1}^{K} \sum_{j=0}^{J} \beta_{kj} S_{k,t-j} + \varepsilon_t, \quad t = 1, \dots, T$$

(R_{t-i} : $i - period\ lagged\ value\ of\ the\ 5 - minutes\ spot\ rate$)

($S_{k,t-j}$: $surprise\ component\ of\ the\ k^{th}\ fundamental\ variable\ lagged\ j\ periods$)

(ε_t : $time - varying\ volatility\ that\ incorporates\ intra - day\ seasonalities$)

- Fixed-Income market

  ➔ Announcement가 채권가격의 변동성을 증가시키지만, 그 날을 넘지 못한다.

  ➔ "New information is fully incorporated in bond prices just two minutes following its announcement."