The Price Relationship Study of Stock

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Outline

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Motivation & Introduction

- Because I’m doing on the asset allocation between the stock price in my thesis, I want to know each other impact between.

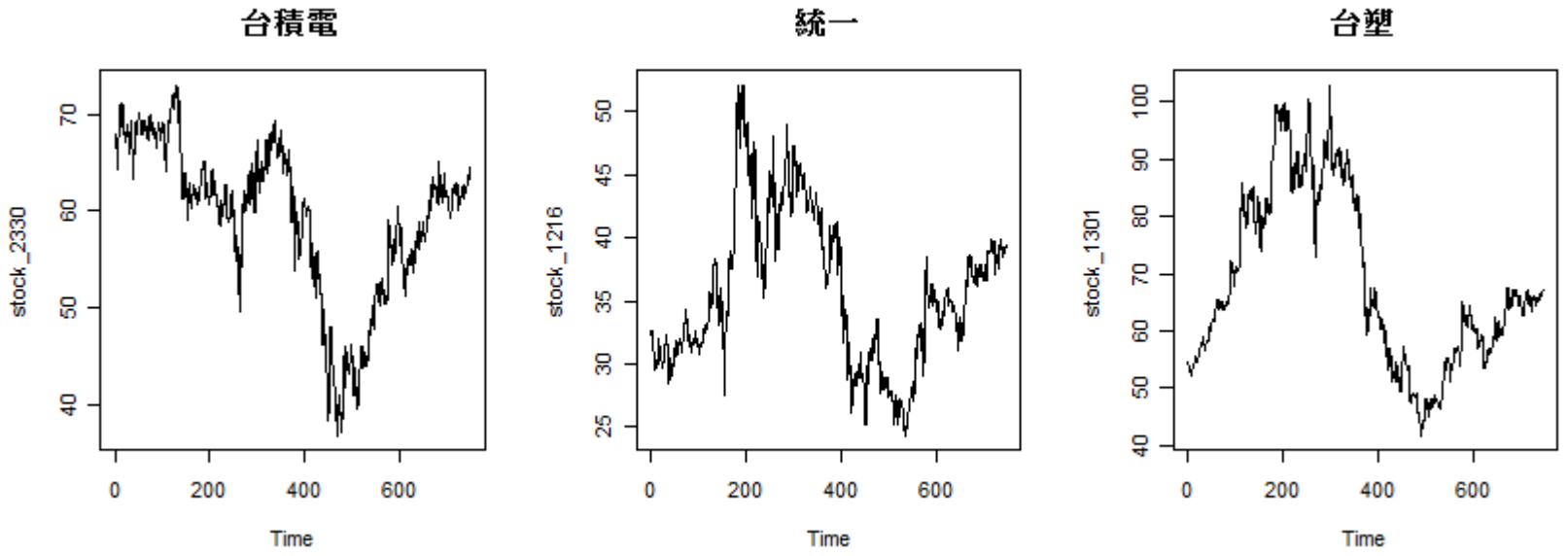
- Prior to the classroom with the AR model can only know the current relationship with the previous period.

- This article by Vector Autoregressive Model (VAR) to explore Taiwan Semiconductor Manufacturing Company (TSM)、Uni-President Enterprises Corporation(UPE)、Formosa plastics Corporation(FP) of the causal relationship.

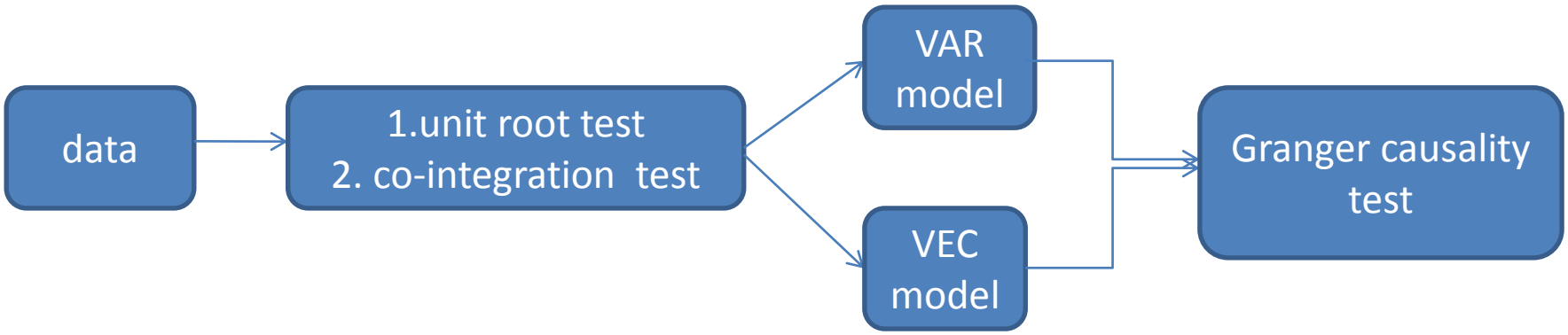
Motivation & Introduction

- Data:

  Daily closing price from 2007.1 to 2009.12



Proposed method



VAR model

Suppose we have k time series $y_{i,t}$, i = 1, . . . , m,and t = 1, . . . , T.
Then a vector autoregression modelis defined as

$$\begin{bmatrix} y_{1,t} \\ y_{2,t} \\ \vdots \\ y_{k,t} \end{bmatrix} = \begin{bmatrix} \phi_{11}^{(1)} & \phi_{11}^{(1)} & \cdots & \phi_{1k}^{(1)} \\ \phi_{21}^{(1)} & \phi_{22}^{(1)} & \cdots & \phi_{2k}^{(1)} \\ \vdots & & \vdots & \\ \phi_{k1}^{(1)} & \phi_{k2}^{(1)} & \cdots & \phi_{kk}^{(1)} \end{bmatrix} \begin{bmatrix} y_{1,t-1} \\ y_{2,t-1} \\ \vdots \\ y_{k,t-1} \end{bmatrix} + \cdots\cdots + \begin{bmatrix} \phi_{11}^{(p)} & \phi_{11}^{(p)} & \cdots & \phi_{1k}^{(p)} \\ \phi_{21}^{(p)} & \phi_{22}^{(p)} & \cdots & \phi_{2k}^{(p)} \\ \vdots & & \vdots & \\ \phi_{k1}^{(p)} & \phi_{k2}^{(p)} & \cdots & \phi_{kk}^{(p)} \end{bmatrix} \begin{bmatrix} y_{1,t-p} \\ y_{2,t-p} \\ \vdots \\ y_{k,t-p} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \\ \vdots \\ \varepsilon_{k,t} \end{bmatrix}$$

In matrix notations

$$\mathbf{Y}_t = \mathbf{\Phi}_1 \mathbf{Y}_{t-1} + \mathbf{\Phi}_2 \mathbf{Y}_{t-2} + \cdots\cdots + \mathbf{\Phi}_p \mathbf{Y}_{t-p} + \varepsilon_t$$

$$E(\varepsilon_t) = 0$$

$$E(\varepsilon_t \varepsilon_s^{'}) = \begin{cases} \Sigma & if \ \ t = s \\ 0 & if \ \ o.w \end{cases}$$

VEC model

In matrix notations

$$\Delta \mathrm{Y_t} = \Phi_1 \Delta \mathrm{Y_{t\text{-}1}} + \Phi_2 \Delta \mathrm{Y_{t\text{-}2}} + \cdots\cdots + \Phi_\mathrm{p} \Delta \mathrm{Y_{t\text{-}p}} + \alpha u_{t-1} + \varepsilon_t$$

u_{t-1}：The previous period error term of the cointegration model

Reference

- 台灣證券交易所: http://www.twse.com.tw/ch/