

$$y = \beta y + \Gamma \epsilon, \text{cov}(\epsilon) = \Phi$$

~~$y = \beta y + \Gamma \epsilon$~~

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ \beta_2 & 0 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} \beta_1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} w \\ \epsilon_1 \\ \epsilon_2 \end{pmatrix}$$

$$\Phi = \begin{pmatrix} \sigma_w^2 & 0 & 0 \\ 0 & \sigma_1^2 & c \\ 0 & c & \sigma_2^2 \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ x \\ y \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 \\ \beta_2 & 0 & 0 \\ \beta_3 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1 \\ x \\ y \end{pmatrix} + \begin{pmatrix} \beta_1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} w \\ \epsilon_1 \\ \epsilon_2 \\ \epsilon_3 \end{pmatrix}$$

$$y = \beta y + \Gamma \epsilon$$

$$\Phi = \begin{array}{c|ccc} & w & \epsilon_1 & \epsilon_2 & \epsilon_3 \\ \hline w & \sigma_w^2 & 0 & 0 & 0 \\ \hline \epsilon_1 & 0 & \sigma_1^2 & 0 & 0 \\ \hline \epsilon_2 & 0 & 0 & \sigma_2^2 & c \\ \hline \epsilon_3 & 0 & c & c & \sigma_3^2 \end{array}$$

Instru Var 3

$$D = \beta D + \Gamma \epsilon$$

$$\begin{pmatrix} T_x \\ T_y \\ X \\ Y \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 \\ \beta_3 & 0 & 0 & 0 \\ \beta_2 & 0 & 0 & 0 \\ 0 & \beta_4 & 0 & 0 \end{pmatrix} \begin{pmatrix} T_x \\ T_y \\ X \\ Y \end{pmatrix} + \begin{pmatrix} 1 & 0 & 0 & 0 & \beta_1 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \epsilon_1 \\ \epsilon_2 \\ \epsilon_3 \\ \epsilon_4 \\ W \end{pmatrix}$$

4×5

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} = 0$$

$$\begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix} \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} T \\ X \\ Y \end{pmatrix}$$

$4 \times 3 \times 2 \times 1 = 24$

$$6 + \begin{pmatrix} 4 \\ 2 \end{pmatrix} = 6 + 6 + 4 \text{ as length of } \epsilon$$

$$= 16 \text{ parameters}$$

4 moments