DISTRIBUTION OF TRANSFORMED VARIABLES

Risk and Asset Allocation* - Springer – *symmys.com

Attilio Meucci

www.symmys.com

Formulas and figures in this presentation refer to the book **Risk and Asset Allocation**, Springer.

The notation, say, (5.24) refers to Formula 24 in Chapter 5 of the book

The notation, say, (T4.12) refers to Formula 12 in the Technical Appendices for Chapter 4, which can be downloaded from www.symmys.com

DISTRIBUTION OF TRANSFORMED VARIABLES

Risk and Asset Allocation **- Springer –** ***symmys.com***

increasing invertible transformations

$$X \mapsto Y \equiv g(X) \qquad (T1.1)$$

DISTRIBUTION OF TRANSFORMED VARIABLES

Risk and Asset Allocation **- Springer –** ***symmys.com***

increasing invertible transformations

$$X \mapsto Y \equiv g(X) \qquad (T1.1)$$

$$f_Y(y) = \frac{f_X\left(g^{-1}(y)\right)}{\left|g'\left(g^{-1}(y)\right)\right|} \qquad (T1.5)$$

$$F_Y(y) = F_X\left(g^{-1}(y)\right) \qquad (T1.6)$$

$$Q_Y(p) = g\left(Q_X(p)\right) \qquad (T1.9)$$

DISTRIBUTION OF TRANSFORMED VARIABLES

Risk and Asset Allocation **- Springer –** ***symmys.com***

increasing invertible transformations

$$X \mapsto Y \equiv g(X) \tag{T1.1}$$

$$f_Y(y) = \frac{f_X\left(g^{-1}(y)\right)}{\left|g'\left(g^{-1}(y)\right)\right|} \tag{T1.5}$$

$$F_Y(y) = F_X\left(g^{-1}(y)\right) \tag{T1.6}$$

$$Q_Y(p) = g\left(Q_X(p)\right) \tag{T1.9}$$

affine transformations

$$X \mapsto Y \equiv g(X) \equiv m + sX \tag{T1.12}$$

DISTRIBUTION OF TRANSFORMED VARIABLES

Risk and Asset Allocation **- Springer –** ***symmys.com***

increasing invertible transformations

$$X \mapsto Y \equiv g(X) \tag{T1.1}$$

$$f_Y(y) = \frac{f_X\left(g^{-1}(y)\right)}{\left|g'\left(g^{-1}(y)\right)\right|} \tag{T1.5}$$

$$F_Y(y) = F_X\left(g^{-1}(y)\right) \tag{T1.6}$$

$$Q_Y(p) = g\left(Q_X(p)\right) \tag{T1.9}$$

affine transformations

$$X \mapsto Y \equiv g(X) \equiv m + sX \tag{T1.12}$$

$$f_Y(y) = \frac{1}{s} f_X\left(\frac{y-m}{s}\right) \tag{T1.14}$$

$$F_Y(y) = F_X\left(\frac{y-m}{s}\right) \tag{T1.15}$$

$$Q_Y(p) = m + sQ_X(p) \tag{T1.16}$$

$$\phi_Y(\omega) = e^{i\omega m}\phi_X(s\omega) \tag{T1.18}$$