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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

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$$f_{\mathbf{X}_B|\mathbf{x}_A}(\mathbf{x}_B) = \frac{f_{\mathbf{X}}(\mathbf{x}_A, \mathbf{x}_B)}{f_{\mathbf{X}_A}(\mathbf{x}_A)} \tag{2.40}$$

$$(\mathbf{X}_A, \mathbf{X}_B) \text{ independent} \Rightarrow f_{\mathbf{X}_B|\mathbf{x}_A}(\mathbf{x}_B) = f_{\mathbf{X}_B}(\mathbf{x}_B) \tag{2.45}$$

$$(\mathbf{X}_A, \mathbf{X}_B) \text{ independent} \Leftrightarrow f_{\mathbf{X}}(\mathbf{x}_A, \mathbf{x}_B) = f_{\mathbf{X}_A}(\mathbf{x}_A)\, f_{\mathbf{X}_B}(\mathbf{x}_B) \tag{2.44}$$

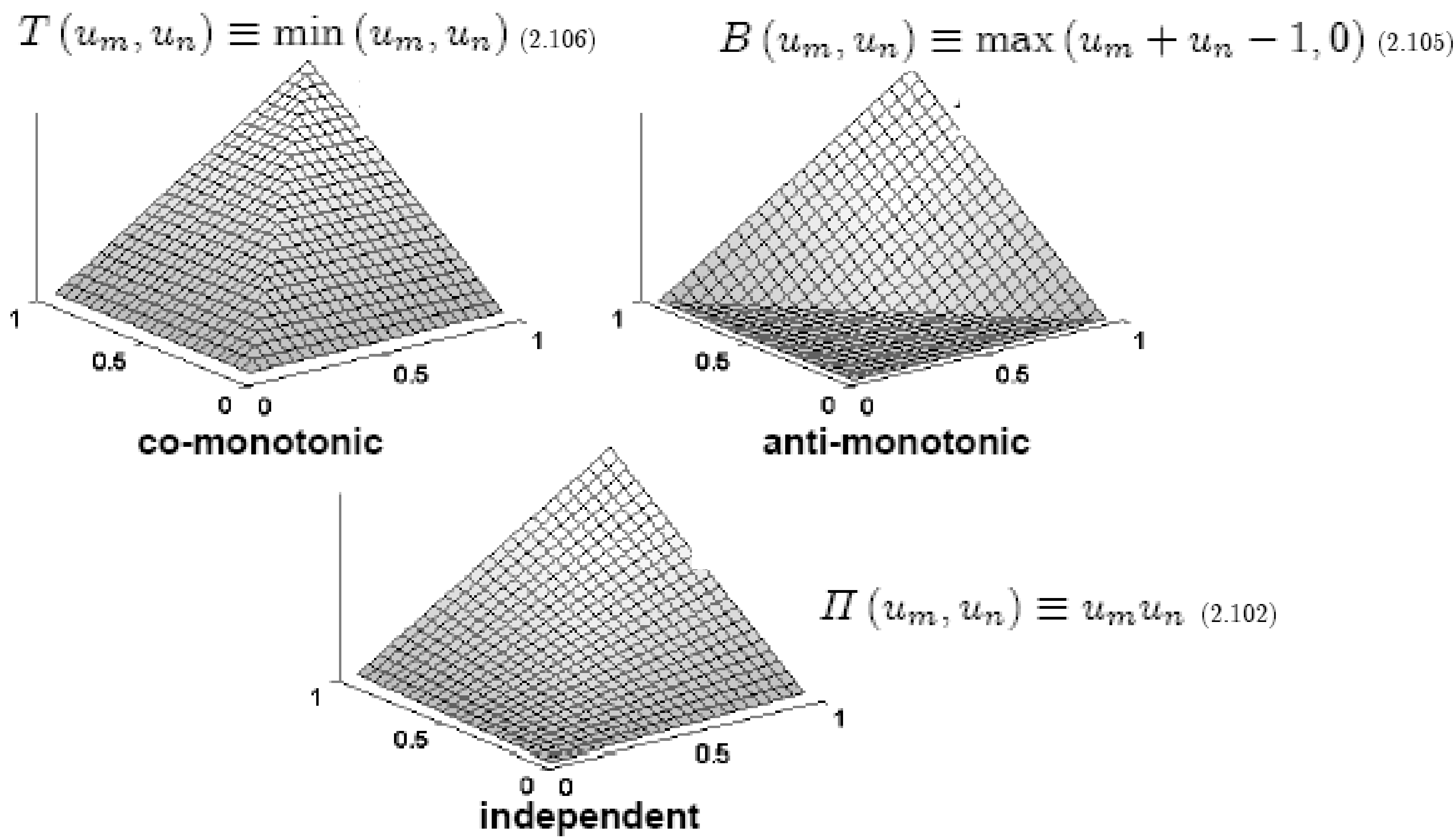

Fig. 2.10. Cumulative distribution function of special bivariate copulas

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dependence

$$(X_m, X_n) \text{ independent} \Leftrightarrow \text{Dep}\left\{X_m, X_n\right\} \equiv 0.$$

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dependence

$$(X_m, X_n) \ \text{independent} \Leftrightarrow \text{Dep}\{X_m, X_n\} \equiv 0.$$

$$\text{SW}\{X_m, X_n\} \equiv k_p \left(\int_{\mathbb{Q}} \left| F_{U_m,U_n}(u_m, u_n) - \Pi(u_m, u_n) \right|^p du_m du_n \right)^{\frac{1}{p}} \tag{2.103}$$

$$k_p \equiv \frac{1}{\|B - \Pi\|_p} = \frac{1}{\|T - \Pi\|_p} \tag{2.107}$$

dependence

$$(X_m, X_n) \text{ independent} \Leftrightarrow \mathrm{Dep}\{X_m, X_n\} \equiv 0.$$

$$\mathrm{SW}\{X_m, X_n\} \equiv k_p \left(\int_{\mathbb{Q}} \left| F_{U_m,U_n}(u_m, u_n) - \Pi(u_m, u_n) \right|^p du_m du_n \right)^{\frac{1}{p}} \qquad (2.103)$$

$$k_p \equiv \frac{1}{\|B - \Pi\|_p} = \frac{1}{\|T - \Pi\|_p} \qquad (2.107)$$

concordance

$$\tau\{X_m, X_n\} \equiv 4 \int_{\mathbb{Q}} \left(F_{U_m,U_n}(u_m, u_n) - \frac{1}{4} \right) f_{U_m,U_n}(u_m, u_n)\, du_m du_n \qquad (2.128)$$

dependence

$$(X_m, X_n) \text{ independent} \Leftrightarrow \mathrm{Dep}\{X_m, X_n\} \equiv 0.$$

$$\mathrm{SW}\{X_m, X_n\} \equiv k_p \left(\int_{\mathbb{Q}} \left| F_{U_m,U_n}(u_m, u_n) - \Pi(u_m, u_n) \right|^p du_m du_n \right)^{\frac{1}{p}} \qquad (2.103)$$

$$k_p \equiv \frac{1}{\|B - \Pi\|_p} = \frac{1}{\|T - \Pi\|_p} \qquad (2.107)$$

$$(X_m, X_n) \text{ independent} \Rightarrow \mathrm{Con}\{X_m, X_n\} = 0.$$

concordance

$$\tau\{X_m, X_n\} \equiv 4 \int_{\mathbb{Q}} \left(F_{U_m,U_n}(u_m, u_n) - \frac{1}{4} \right) f_{U_m,U_n}(u_m, u_n) \, du_m du_n \qquad (2.128)$$

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dependence

$$(X_m, X_n) \text{ independent} \Leftrightarrow \mathrm{Dep}\{X_m, X_n\} \equiv 0.$$

$$\mathrm{SW}\{X_m, X_n\} \equiv k_p \left(\int_{\mathbb{Q}} \left| F_{U_m,U_n}(u_m, u_n) - \Pi(u_m, u_n) \right|^p du_m du_n \right)^{\frac{1}{p}} \qquad (2.103)$$

$$k_p \equiv \frac{1}{\|B - \Pi\|_p} = \frac{1}{\|T - \Pi\|_p} \qquad (2.107)$$

$$(X_m, X_n) \text{ independent} \Rightarrow \mathrm{Con}\{X_m, X_n\} = 0.$$

concordance

$$\left\{ \begin{array}{ll} \rho\{X_m, X_n\} \equiv \dfrac{\mathrm{Cov}\{U_m, U_n\}}{\mathrm{Sd}\{U_m\}\,\mathrm{Sd}\{U_n\}} & (2.130) \\ \\ \tau\{X_m, X_n\} \equiv 4 \displaystyle\int_{\mathbb{Q}} \left(F_{U_m,U_n}(u_m, u_n) - \frac{1}{4} \right) f_{U_m,U_n}(u_m, u_n)\, du_m du_n & (2.128) \end{array} \right.$$