

Visualisation in econometrics

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1 Partie 1 : Covariance

On commence par définir de manière littéraire la covariance

What is Covariance ?

A covariance refers to the measure of how two random variables will change when they are compared to each other.

Spearman's rank correlation coefficient

Measures the association based on the ranks of the variables.

$$\hat{\theta} = \frac{\sum_{i=1}^n (R_i - \bar{R})(S_i - \bar{S})}{\sqrt{\sum_{i=1}^n (R_i - \bar{R})^2 \sum_{i=1}^n (S_i - \bar{S})^2}}$$

where R_i and S_i are the rank of the x_i and y_i values, respectively.

A bit Theory

On écrit les hypothèses qui régissent les calculs :

Assume 2 random variables X, Y and a random bivariate sample $(x_1, y_1), (x_2, y_2), \dots, (x_N, y_N)$.

Let's consider that the observations are independent of each other, however X, Y could have an impact on each other.

A bit Theory

Classical Covariance:

$$\sigma_x^2 = \frac{1}{n} \sum_{x=1}^n (x_i - \bar{x})^2 = \frac{1}{n} \sum_{x=1}^n x_i^2 - \bar{x}^2 \quad (1)$$

Hefferman Covariance:

$$\text{cov}(X, Y) = \frac{2}{n(n-1)} \sum_{i=1}^{n-1} \sum_{j>i}^n \frac{1}{2} (x_i - x_j)(y_i - y_j) \quad (2)$$

How it looks ?!

Montrer quelques représentations de la Covariance :

The first use of Venn Diagrams : Cohen, J., and Cohen, P. (1975),
Applied Multiple Regression/Correlation Analysis for the Behavioral
Sciences, Hillside, NJ: Lawrence Erlbaum Associates. Peter Kennedy :
2001 : Venn Diagrams for Regression Kevin Hayes : Mai 2011 :

Covariance triangle rectangle

Scatterplot : *Qu'il'afaitenpremier??Articlequirelatelacovariancerectangle?*

L'étape d'après ?

- Covariance rectangle très coûteuse en terme de performance !

Contextualisation

Explain the issues about the graphic representation in econometrics from the start:

What are the best representation nowadays :

Lister ici les documents faisant référence à la chronologie de la visualisation en économétrie :

Diagramme de Venn Représentation de la covariance en triangle rectangle Régression etc...