

### What are the main issues ?

- Quantitative analysis of economic, demographic, anthropological transitions and their interactions in History
  - Highlighting the specific profiles of each transition
  - Study of the complex relations between these transitional phenomena
- Can we achieve these objectives with cross-sectional data ?

### Clustering and Time serialization

- Economic transition : Clustering of countries**
  - Active variables for Hierarchical Cluster Analysis HCA

- Initial active variables
  - %VA in the following sectors : Agriculture, Industry, Services
  - %Employment in the following sectors : Agriculture, Industry, Services
- Additional criterion of intra-class homogeneity
  - GDP per capita

- Final active variables: Variables in parentheses (right term)

$$\left(\frac{GDP}{Pop}\right) = \sum_{i=1}^3 \left(\frac{Pop_{15-64}}{Pop}\right) \times \left(\frac{\sum_{u=1}^3 E_u}{Pop_{15-64}}\right) \times \left(\frac{E_i}{\sum_{u=1}^3 E_u}\right) \times \left(\frac{GDP_i}{E_i}\right)$$

$Pop$  is the total population,  
 $Pop_{15-64}$  is the population from 15 to 64 years old,  
 $E_i$  is the employment by sector,  
 $\sum_{u=1}^3 E_u$  is the total employment,  
 $GDP_i$  is the  $GDP$  of sector  $i$ .

- Time serialization of the economic clusters**
  - Monotonous transitional variable to be used : % Jobs in agriculture

- Demographic transition : Clustering of countries**
  - Active variables for Hierarchical Cluster Analysis HCA

- Initial active variables
  - Birth rate
  - Death rate

- Additional criterion of intra-cluster homogeneity
  - Net migration rate?

- Final active variables: Terms on the right

Fundamental equations.

Equation 1 :  $(PGR)_t = (RNI)_t + (NMR)_t$

Equation 2 :  $(PGR)_t = (BR)_t - (DR)_t + (NMR)_t$

$(PGR)_t$  : The population Growth Rate at the date  $t$ .  
 $(RNI)_t$  : The Rate of Natural Increase at the date  $t$   
 $(NMR)_t$  : The Net Migration Rate at the date  $t$ .  
 $(BR)_t$  : Refers to the Birth Rate at the date  $t$ .  
 $(DR)_t$  : Refers to the Death Rate at the date  $t$ .

- Time serialization of the demographic clusters**
  - Monotonous transitional variable to be used : Infant Mortality Rate

- Anthropological Clustering of countries**
  - Active variables for Hierarchical Cluster Analysis HCA

- Traditional vs Secular-rational values

- Traditional values dimension

- Societies near the traditional pole emphasize the importance religion, of parent-child ties and deference to authority, along with absolute standards and traditional family values, and reject divorce, abortion, euthanasia, and suicide.
- These societies have high levels of national pride, and a nationalistic outlook.
- Societies with secular-rational values
  - have the opposite preferences on all of these topics

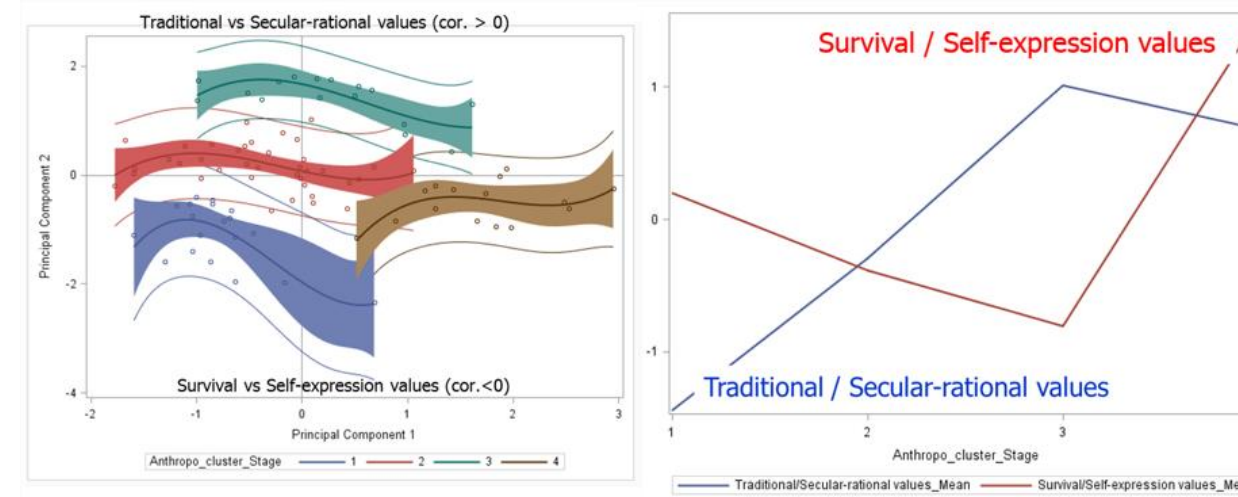
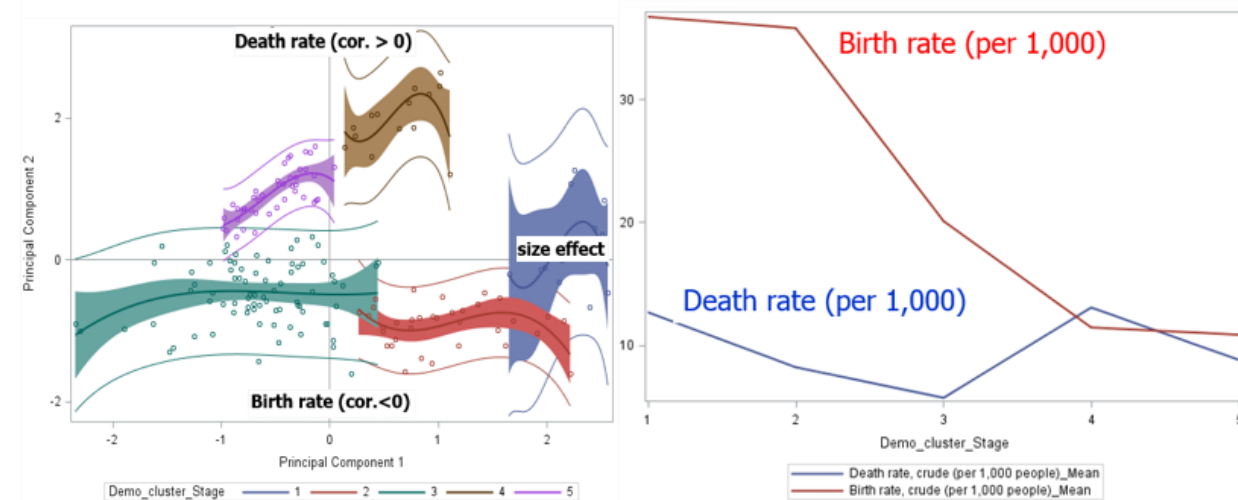
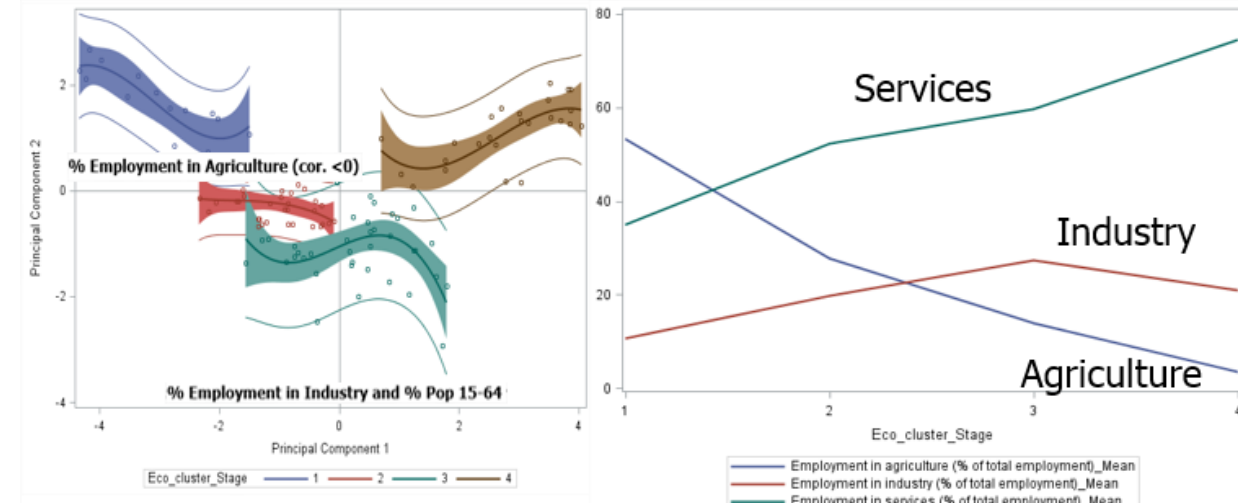
- Survival vs Self-expression values

- Survival values
  - emphasis on economic and physical security above all
- Self-expression values
  - emphasis on subjective well-being, self-expression and the quality of life.

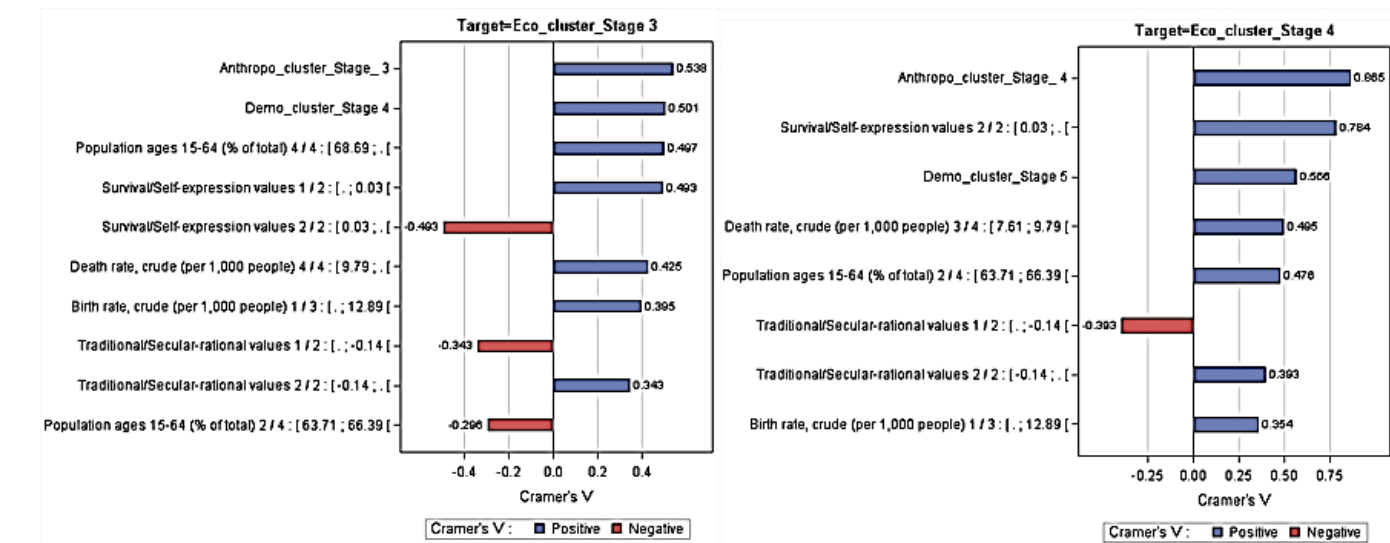
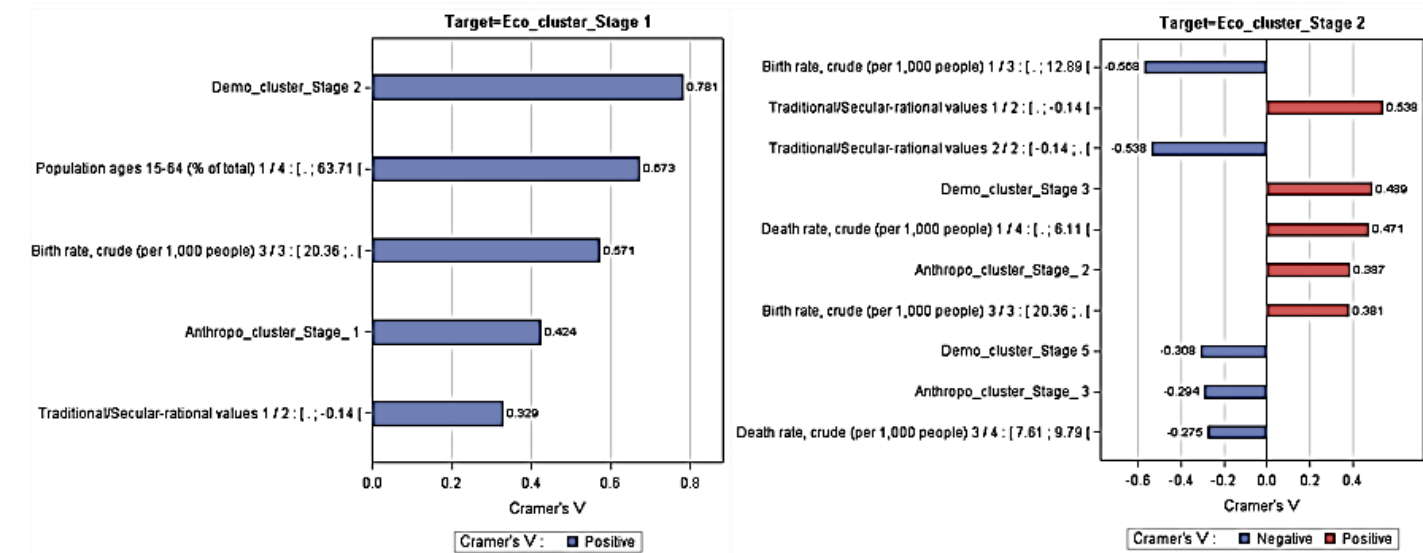
- Time serialization of the anthropological clusters**
  - Monotonous transitional variable to be used : Infant Mortality Rate

### Main Results

#### Specific profiles of each transition



### Significant and complex associations between phases from different transitions



### Conclusion

- Through this study, we were able to:
  - Derive longitudinal conclusions from cross-sectional data, by using Clustering and Time serialization techniques
  - Discover the phases currently observable among the countries of the world, for each of the 3 transitions (economic, demographic, anthropological)
  - Demonstrate significant and complex associations between phases from different transitions
- Next steps with cross-sectional approach
  - Social Classes transition
  - Institutional transition

### References

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