

QUANTITATIVE TOOLS LEVEL 1

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COURSE OUTLINE

I – One character descriptive statistics

The emphasis will be put on the understanding, the analysis and the interpretation of statistical data.

- **1 / Measurement of relative variations (bibl: B2, ch. 2 and 4)**

Growth

Degrowth

Percentages

Variations in percentage points

Average growth rate

Comparison of growth

Applications: elasticity, penetration rates, degree of openness, inflation, exchange rates, VAT within and outside, scale of income tax with progressive marginal rate, tax at a fixed rate with fixed allowance

- **2 / Charts and Graphs (bibl: B1, ch. 1, 2, 3, 4) – (bibl : C chap 1)**

Histogram

Cumulative frequency polygon

The graphics and the classical "traps"

The spinning tops

Applications: statistical distributions, age structure, ...

- **3 / Core Values (bibl: B1, ch. 5)) – (bibl : C chap 2)**

Mode

Median

Arithmetical, geometrical and harmonical means

structural effects

The common pitfalls of means

Applications: analysis of statistical series

- **4 / Values of dispersion and concentration (bibl: B1, ch. 6)) – (bibl : C chap 3)**

Inter-quantiles

Standard deviation

Middle-medial deviation

Lorenz curve - Gini index

Applications: Measuring inequality, dualism analysis, analysis of wage distributions, income distribution, exchange rate volatility,

- **5 / Synthetic Index (bibl: B2, ch. 1 and 3)**

Properties index

Paasche index

Laspeyres Index

"Soft" indicators: HDI

Applications: value / volume, terms of trade, purchasing power of exports, common currency / constant currency, nominal / real...

II – Two characters descriptive statistics

The analysis of possible links between economic variables and in particular the explanatory scope of these links. The analysis will be limited to linear problems, without change of variable.

- **1 / Linear adjustment (bibl: B3, ch. 1)) – (bibl : C chap 13)**

Method of least squares (OLS)

- **2 / Correlation. (bibl: B3, ch. 2)) – (bibl : C chap 8)**

Sensitive approach and interpretation of results

Total variance

Explained variance

Residual variance

The difficulties of analyzing a correlation coefficient.

III – Financial Calculus

This part of the program concerns financial or deterministic mathematics and considers time as being discrete and not continuous.

Financial techniques include a basic approach to investment choices.

The emphasis in this section will be on applications.

- **1 / Simple interest (bibl: A, ch. 2)**

Principles

Interest checked off - effective rates of investment

Discount, discount shopping, rational discount.

Equivalent effects of simple interests.

Search of a equivalence date.

Replacement of several effects by a single effect

Average maturity

- **2 / Compound Interest rates (bibl: A, ch. 3)**

Principles

Equivalent Rates

Proportional rates

Search for effective rates

Schedule discounting, loan repayments

Applications: Search of the duration, the deposit rate, the amount invested or the amount obtained knowing the other data of the problem.