Miskolci Egyetem Gazdaságtudományi Kar
Üzleti Információgazdálkodási és Módszertani Intézet

Ratio Statistics

Petra Petrovics

Ratio Statistics

- This procedure provides a variety of descriptive statistics for the ratio of two data.
- $R = \frac{A}{B}$
- *Notations*

  n = Number of observations

  A_i = Numerator of the i-th ratio ($i = 1, \ldots, n$).

  B_i = Denominator of the i-th ratio ($i = 1, \ldots, n$).

  R_i = The i-th ratio ($i = 1, \ldots, n$). Often called the appraisal ratio.

Ratios

1. Partitional
2. Coordination
3. Comparative
4. Intensitivity

I. 'Partitional ratio'

- $R_{\text{partitional}} = \frac{partial.data_i}{\sum} (\%)$

- E.g:

Gender	Number of people (person)	Ratio of gender (%)
Male	40	67
Female	20	33
Total	60	100

II. 'Coordination ratio'

- $R_{coord.} = \frac{partial.data_i}{partial.data_j}$
- E.g:

Gender	Number of people (person)
Male	40
Female	20
Total	60

$$\frac{male}{female} = \frac{40}{20} = 2$$

$$\frac{female}{male} = \frac{20}{40} = 0{,}5$$

III. 'Comparative ratio'

- Dynamic ratio
- Territorial ratio
- Fulfilment of the plan
- Target ratio

III.1. Dynamic ratio

$$\frac{current.temporal.data_i}{base.data_i}$$

- **Base**: every data of the time series is correlated to the base temporal data; $b_i = \sum_{\tau} c_i$
- **Chain**: every data of the time series is correlated to the previous temporal data; $c_i = \frac{b_i}{b_{i-1}}$

$$b_i = \frac{y_i}{y_0} \qquad c_i = \frac{y_i}{y_{i-1}}$$

Example

Number of phone calls in Hungary

Period	Million call	2000=100%	Prev.year=100%
2000	2258	100,0	-
2001	3780	167,4	167,4
2002	4399	194,8	116,4
2003	4700	208,1	106,8
2004	5124	226,9	109,0
2005	5995	265,5	117,0
2006	6759	299,3	112,7
2007	7173	317,7	106,1
2008	7777	344,4	108,4

Relation between the partitional ratio and dynamic ratio

Factories	Turnover (MFt)		Partitional of turnover (%)		Ratio (%) $\frac{t_1}{t_0}$
	t_0	t_1	$t_{0\ (\%)}$	$t_{1\ (\%)}$	
C	30	36	20	19	120
D	40	60	27	32	150
E	70	77	47	41	110
F	10	14,5	6	8	145
Total	150	187,5	100	100	125

$$\overline{R} = \frac{\sum A}{\sum B} = \frac{187,5}{150} = 1,25$$

$$\overline{R} = \frac{\sum B_i \cdot R_i}{\sum B_i} = \frac{30 \cdot 1,2 + 40 \cdot 1,5 + 70 \cdot 1,1 + 10 \cdot 1,45}{150} = 1,25$$

$$\overline{R} = \frac{\sum B_i \cdot R_i}{\sum B_i} = \frac{0,2 \cdot 1,2 + 0,27 \cdot 1,5 + 0,47 \cdot 1,1 + 0,06 \cdot 1,45}{1} = 1,25$$

$$\overline{R} = \frac{\sum A_i}{\sum \frac{A_i}{R_i}} = \frac{187,5}{\frac{36}{1,2} + \frac{60}{1,5} + \frac{77}{1,1} + \frac{14,5}{1,4}} = 1,25$$

- **III.2. *Territorial ratio***

E.g: $\frac{Hungary}{Germany}$

- **III.3. *Fulfilment of the plan*** (%)

$$\frac{fact.data}{plan.data}$$

- **III.4. *Target ratio*** (%)

$$\frac{plan.data}{base.data}$$

IV. 'Intensitivity ratio'

= a quotient of 2 data from 2 different statistical row

1. ***'Specific coefficient'*** $\frac{kg}{pieces}$
2. ***'Density coefficient'***: e.g: density of population $\frac{person}{qkm}$
3. ***'Productivity coefficient'***
   - direct: e.g: $\frac{pieces}{hour}$

     the higher is the productivity the higher is this figure
   - indirect: e.g: $\frac{hour}{pieces}$

     the higher is the productivity the lower is this figure
4. ***'Coefficient of demographical changes'***

   e.g: birth rate coefficient ‰

Raw and cleaned ratio

$$\frac{A}{B} = \frac{A}{b} \times \frac{b}{B}$$

- A: quantity, which should be correlated to B
- B: the whole population
- b: part of the population

Thanks for your attention!