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INCOMPLETE ADMINISTRATIVE DATA FOR PRODUCTION OF OFFICIAL STATISTICS

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ESSnet - Use of Administrative Data in Business Statistics

WP4 - Timeliness of Administrative Sources

Joint work of 7 NSI:

DESTATIS (Germany),
Statistics Estonia,
ISTAT (Italia),
Statistics Finland,
Statistics Lithuania,
Statistics Netherlands,
ONS (UK)

Aim of the project: **to create recomendations for all countries for dealing with incomplete administrative data**

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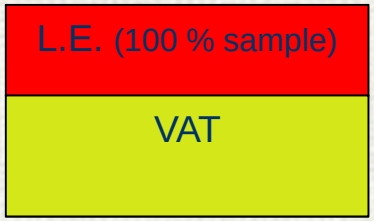
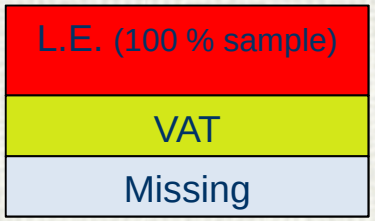
VAT (Value Added Tax) for STS (Short Term Statistics)

Final situation: (after year)
- all admin data are available for NSIs
- data cover the population



Monthly and quarterly estimates:
Part of admin data are 'missing'



Questions to be answered:

1. which of the identified and improved estimation methods produce good quality estimates for STS;
2. how estimates should be revised when more complete administrative data become available.

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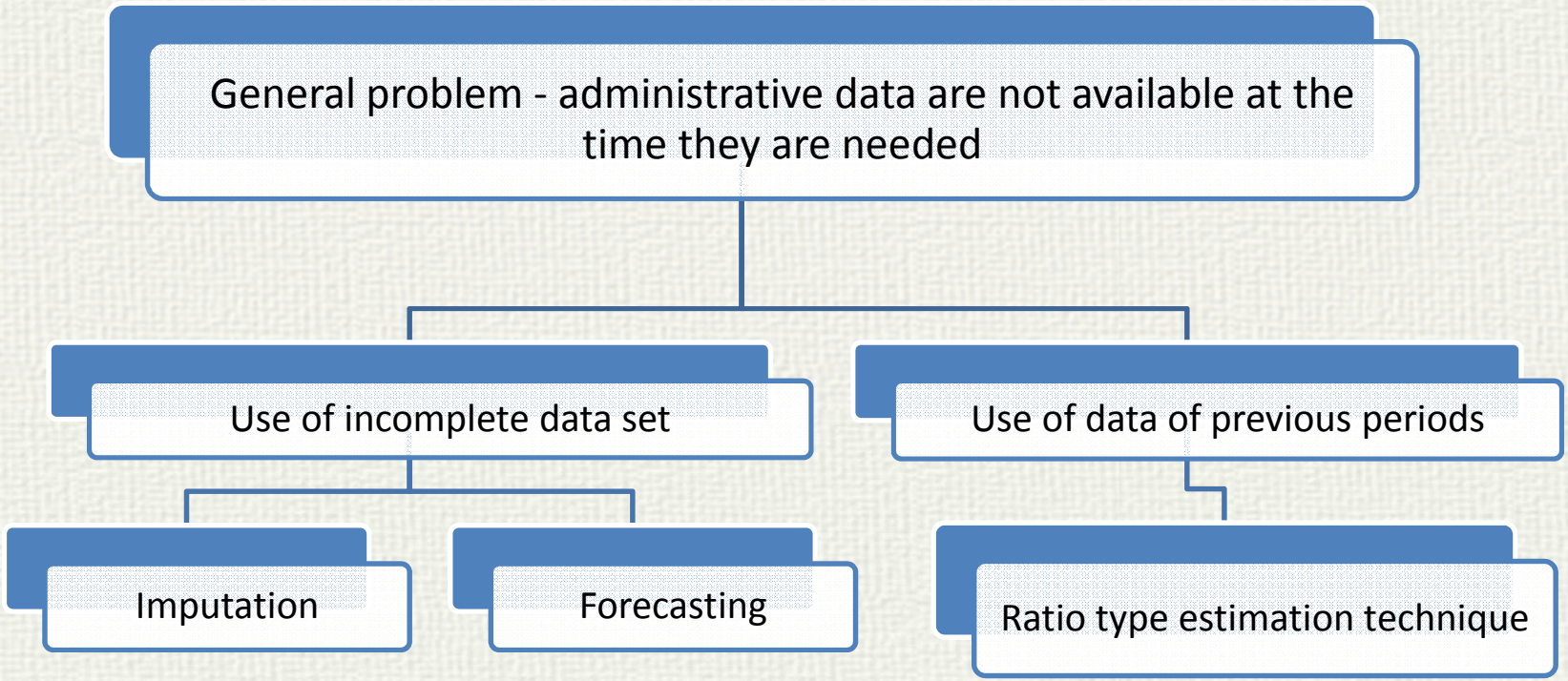
Two situations:

a. **VAT fairly complete and representative**

short summary of established techniques

b. **VAT not complete and/or not-representative**

regression techniques should be applied


General problem - administrative data are not available at the time they are needed
Use of incomplete data set
Use of data of previous periods
Imputation
Forecasting
Ratio type estimation technique

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VAT not complete and/or not-representative

Horvitz–Thompson: $$\hat{Y}^{HT} = \sum_{k \in s} \frac{1}{\pi_k} y_k$$

Ratio: $$\hat{Y}^{Ratio} = X_1 \frac{\hat{Y}^{HT}}{\hat{X}_1^{HT}} = \hat{Y}^{HT} \frac{X_1}{\hat{X}_1^{HT}}$$

Generalized regression (GREG) $$\hat{Y}^{GREG} = \hat{Y}^{HT} + \sum_{j=1}^{J} \hat{B}_j (X_j - \hat{X}_j^{HT})$$

where $$X_j = \sum_{k \in U} x_{kj}$$ – the total of the auxiliary variable x_j

$$\hat{\mathbf{B}} = (\hat{B}_1, ..., \hat{B}_J) = (\sum_{k \in s} \mathbf{x_k} \mathbf{x_k}' / \sigma_k^2 \pi_k)^{-1} \sum_{k \in s} \mathbf{x_k} y_k / \sigma_k^2 \pi_k$$

the vector of regression coefficients derived applying a linear regression model

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Lithuanian VAT data

- No VAT data of reference period are available for data estimation;
- VAT data for (t-1) period are used as auxiliary information;
- Ratio and GREG estimators were analyzed.

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Coefficients of correlation for Income (survey) / (VAT)

	Month	1	2	3	4	5	6	7	8	9	10	11	12
2010	Inc.(t)/VAT(t-1)	0,996	0,999	0,973	0,996	0,999	0,999	0,999	0,998	0,997	0,998	0,997	0,997
	Inc.(t)/VAT(t)	1,000	0,974	1,000	1,000	1,000	1,000	1,000	1,000	0,999	0,999	0,998	0,983
2011	Inc.(t)/VAT(t-1)	0,982	0,996	0,998	0,998	0,998	0,999	0,999	0,999	0,999	1,000	1,000	0,982
	Inc.(t)/VAT(t)	0,999	0,999	0,999	0,999	0,999	1,000	0,998	0,997	0,998	0,991	0,993	0,999

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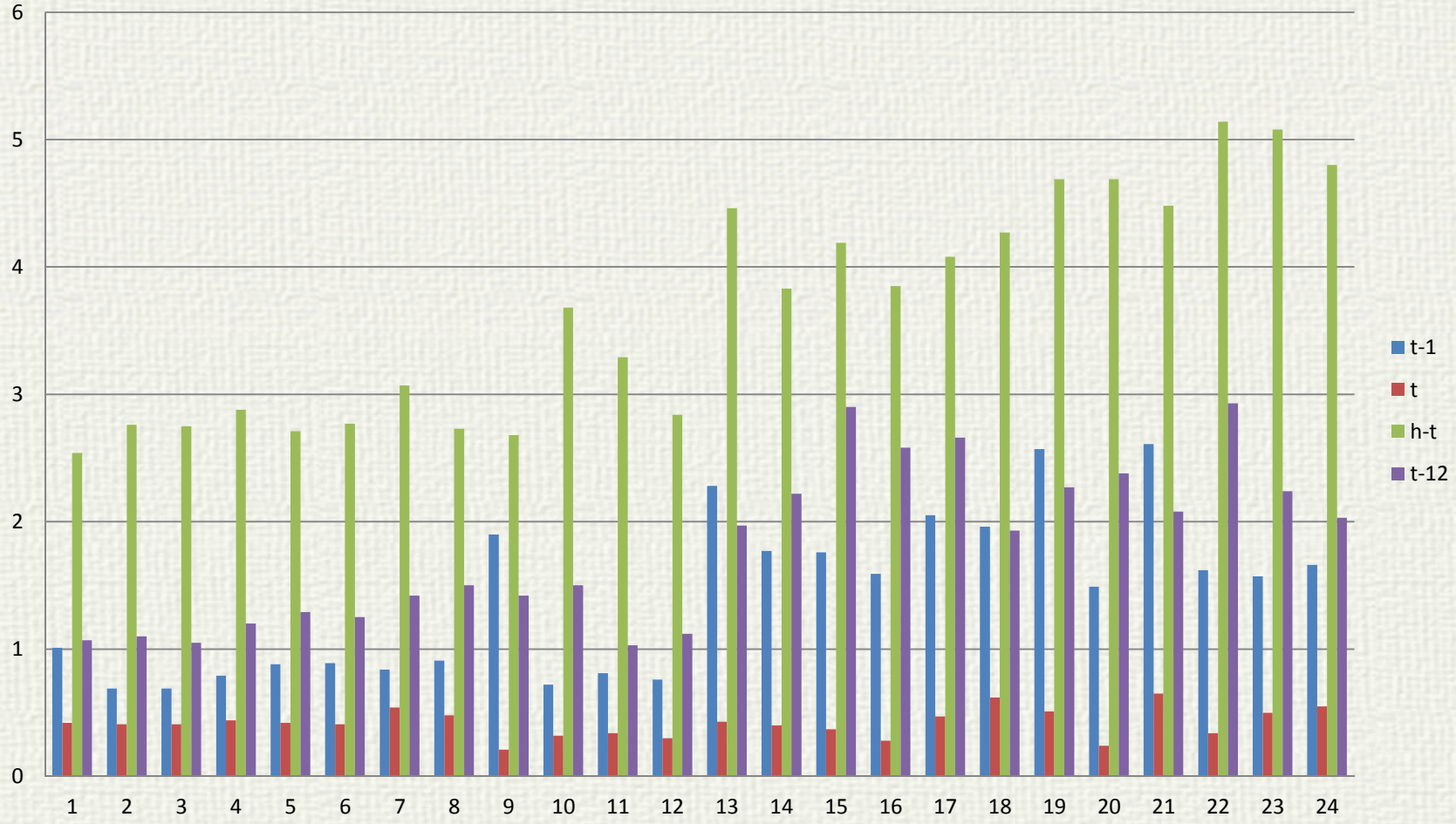
I56 Food and beverage service activities

Relative standard error



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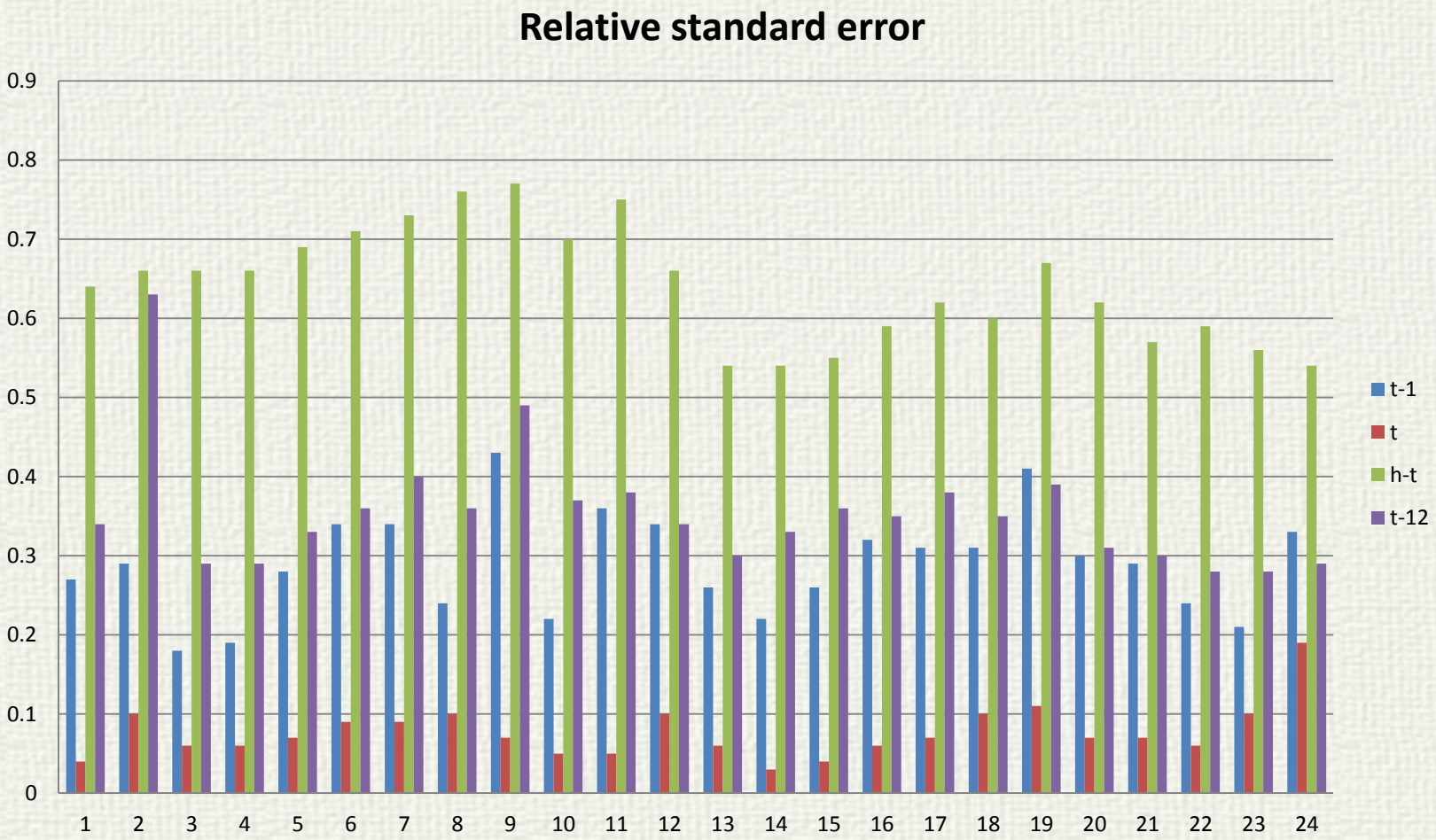
G47 Retail trade, except of motor vehicles, motorcycles and fuel



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Future plans
Italian solution for timeliness (used till 2008 for employment data)

- Survey for large enterprises (>500 employees);
- Only incomplete administrative data for small and medium enterprises – **referred as sample;**
- GREG estimator was applied.

Problems that have to be solved

- Non randomness of the sample;
- Small areas.

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Thank you for your attention ☺