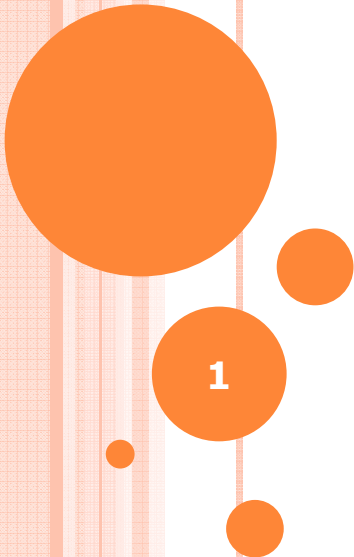




ANALYSIS OF REPEATED BUSINESS SURVEYS IN UKRAINE

*Workshop of Baltic-Nordic-Ukrainian
Network on Survey Statistics*

24-28 August 2012,

Valmiera, Latvia

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for Statistical Research**

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CONTENT

- Repeated surveys in Ukrainian official statistics
- Example: investment survey
- Survey designs
- Estimators
- Simulation study

REPEATED SURVEYS IN UKRAINIAN OFFICIAL STATISTICS

Monthly	44
Quarterly	40
Twice per quarter	1
Semi-annual	4
Annual	76
Once per 2 years	2
Once per 3 years	1
Once per 4 years	1
Total	169

Ukrainian investment survey

Characteristic	Content
Kind of economic activity	• All kinds
Geographical coverage	• All regions in Ukraine (27)
Unit	• Enterprise
Periodicity	• Quarter; • Annual
Questionnaire	• № 2-investment (quarter) “Capital investment”; • № 2-investment (annual) “Capital investment, retirement and amortization of assets”
Main variable	• Total capital investment
Kind of survey	• quarterly: – now: cut-off with census; – plan: cut-off with sample: - census for large and middle enterprises; - sample for small enterprises; • annually: census
Levels of publication	• National level; • Regions; • Kinds of economic activities (2digit by NACE); • Institutional sector of economy; • Organization and legal form of management

SURVEY DESIGN

TYPE I

- stratification of small enterprises on type of activity (2-digit level, division of NACE)
(58 strata)
- outlier detection (rule of 3 sigma)
- Neyman allocation in strata (domains) with min=10

SURVEY DESIGN

TYPE II

- stratification of small enterprises on type of activity (2-digit level, division of NACE) + number of employee (348 strata)
- small strata detection (≤ 10 items)
- outlier detection (rule of 3 sigma)
- Neyman allocation in strata with $\min=10$

SURVEY STRATEGIES

TYPE III

- stratification of small enterprises on type of activity (2-digit level, division of NACE) + number of employee (348 strata)
- outlier detection in domains (rule of 3 sigma)
- Neyman allocation in domains with min=10
- small strata detection (≤ 2 items)
- Proportional allocation in strata with min=2

ESTIMATORS

- Horvitz-Tompson estimator;
- GREG(x) with 2009 capital investment as an explanatory variable (cor=41%);
- GREG(z) with number of employee as an explanatory variable (cor=3%)
- GREG(x+z) with 2009 capital investment and number of employee as explanatory variables

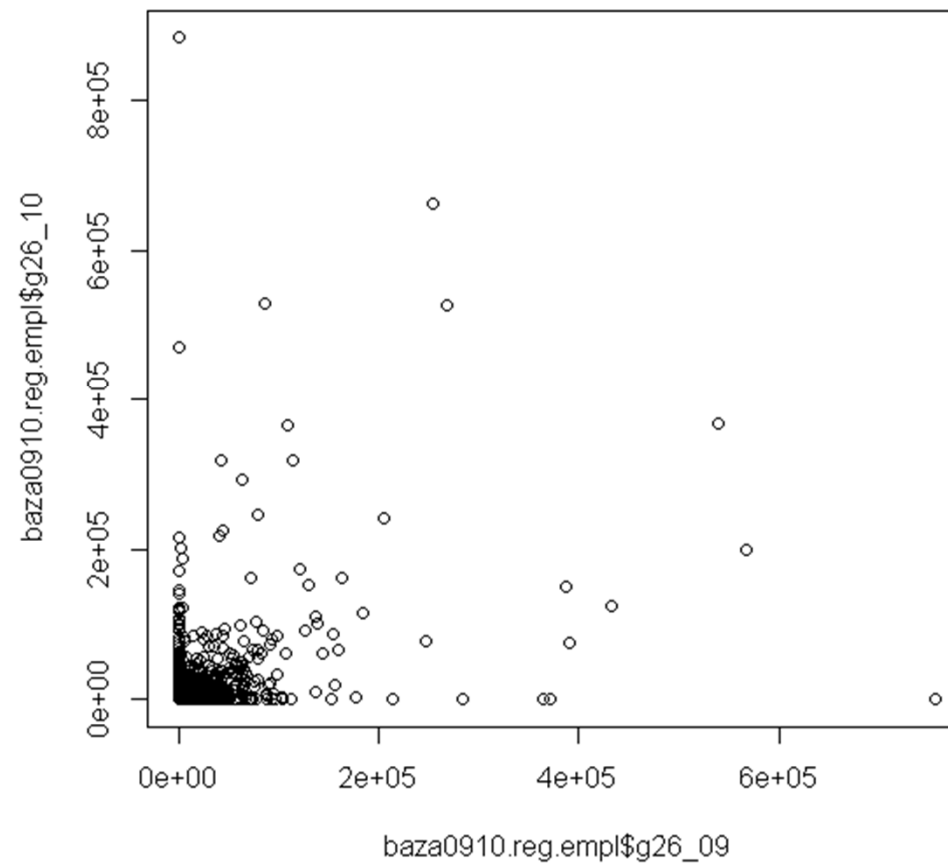
RRMSE FOR THE WHOLE POPULATION

Design	HT	GREG(x)	GREG(z)	GREG(x+z)
I	2,49	2,56	2,55	2,71
II	9,21	10,03	9,19	-
III	2,48	-	-	-

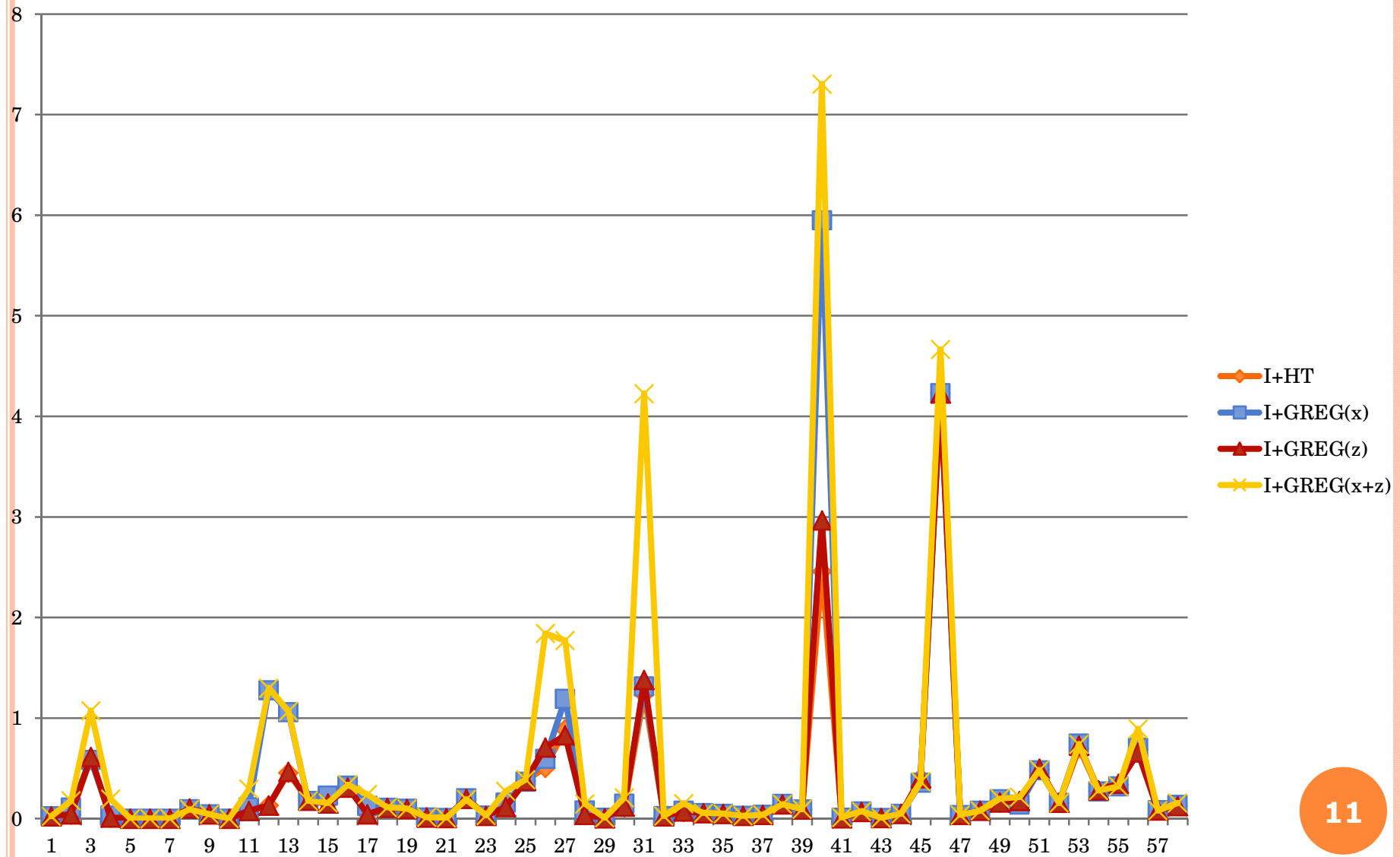
relative root mean squared error (RRMSE)

$$RRMSE = \sqrt{\frac{1}{K} \sum_{i=1}^K (\hat{y}_d(s_i) - \bar{Y}_d)^2} / \bar{Y}_d$$

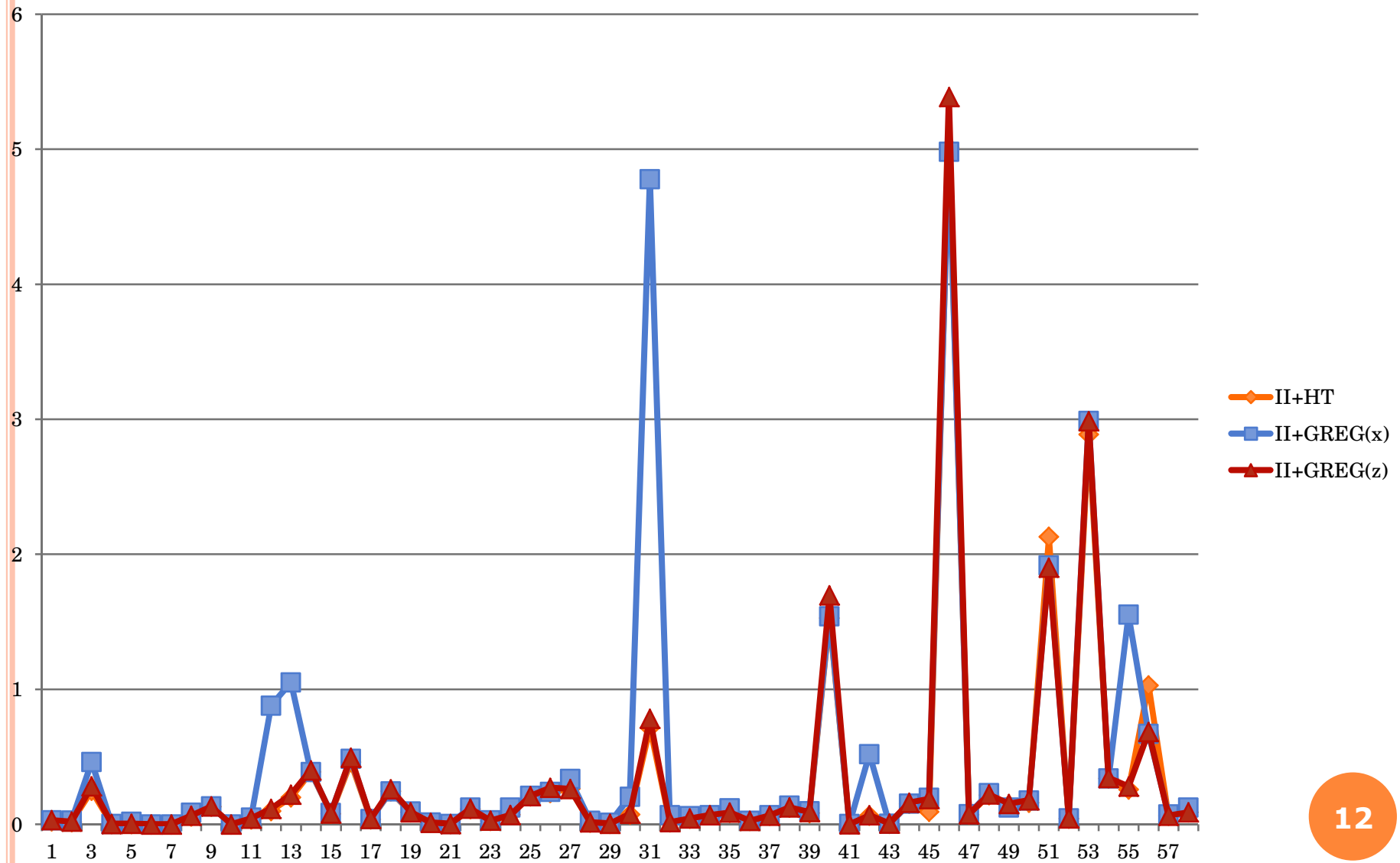
2009v2010 SCATTER-PLOT



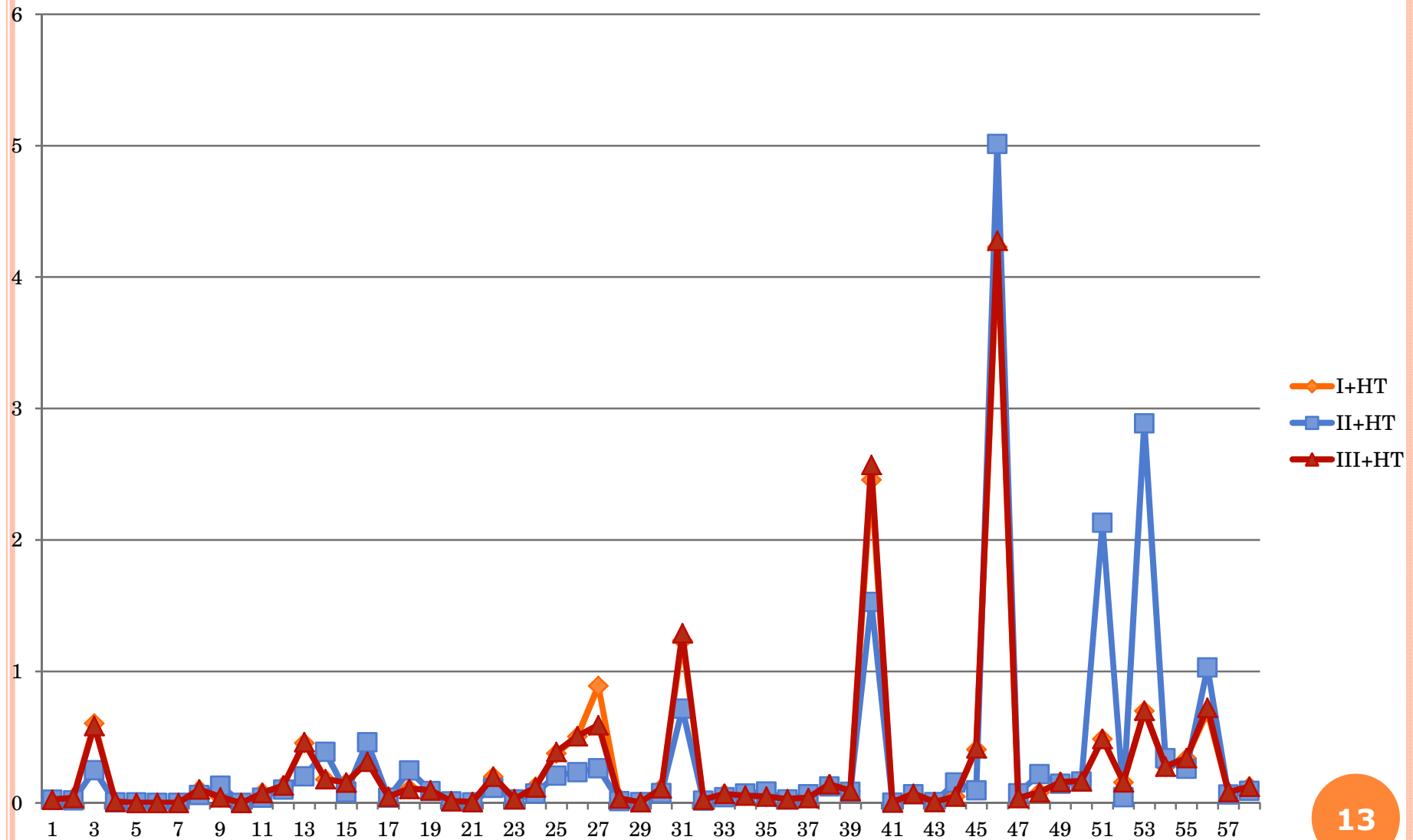
RRMSE FOR TYPES OF ACTIVITIES



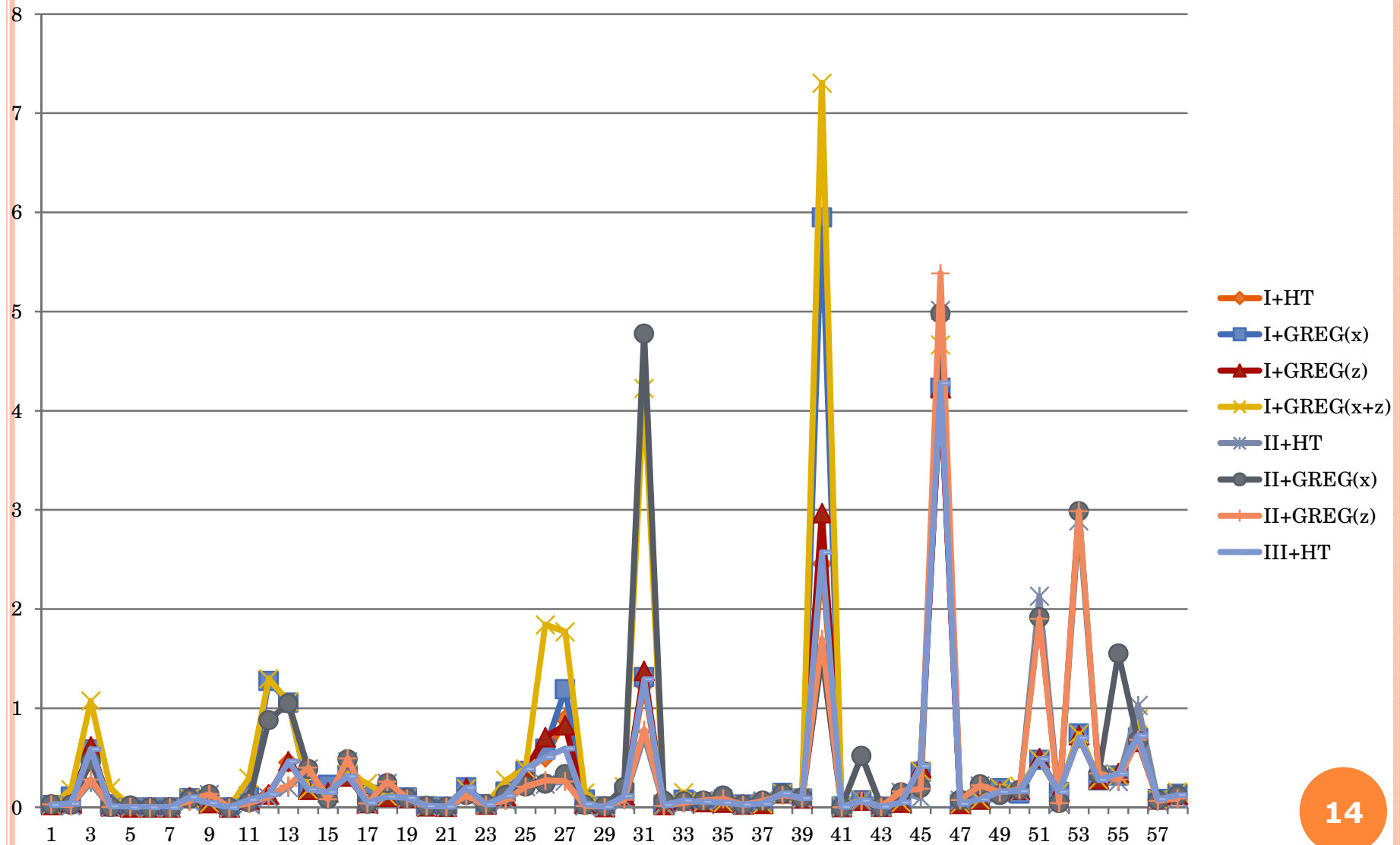
RRMSE FOR TYPES OF ACTIVITIES



RRMSE FOR TYPES OF ACTIVITIES



RRMSE FOR TYPES OF ACTIVITIES



**THANK YOU FOR YOUR
ATTENTION!**