LISREL

- Mels, G. (2006). *LISREL for Windows: Getting Started Guide*. Lincolnwood, IL: Scientific Software International, Inc.
- LISREL:
  - Structural Equation Modeling,
  - Multilevel Structural Equation Modeling,
  - Multilevel Linear and Nonlinear Modeling,
  - Formal Inference-based Recursive Modeling, and
  - Generalized Linear Modeling.

Kazalo

1 Uvod

- Aplikacije:
  - LISREL: Standard and Multilevel Structural Equation Modeling + Full Information Maximum Likelihood (FIML) method for missing data.
  - PRELIS: Application for manipulating data, transforming data, generating data, computing moment matrices, computing asymptotic covariance matrices, performing regression analyses, performing exploratory factor analyses of ordinal and continuous variables, etc.
  - MULTILEV: Multilevel linear and nonlinear models.
  - CATFIRM: Formal Inference-based Recursive Modelling (categorical data).
  - CONFIRM: Formal Inference-based Recursive Modelling (continuous data).
  - SURVEYGLIM: Generalized LInear Models (GLIMs).
  - MAPGLIM: Fits GLIMs to multilevel data.
- Vhodni podatki: SPSS, SAS, STATA, Statistica, Microsoft Excel, SYSTAT, BMDP, etc. kot PRELIS System File (PSF).

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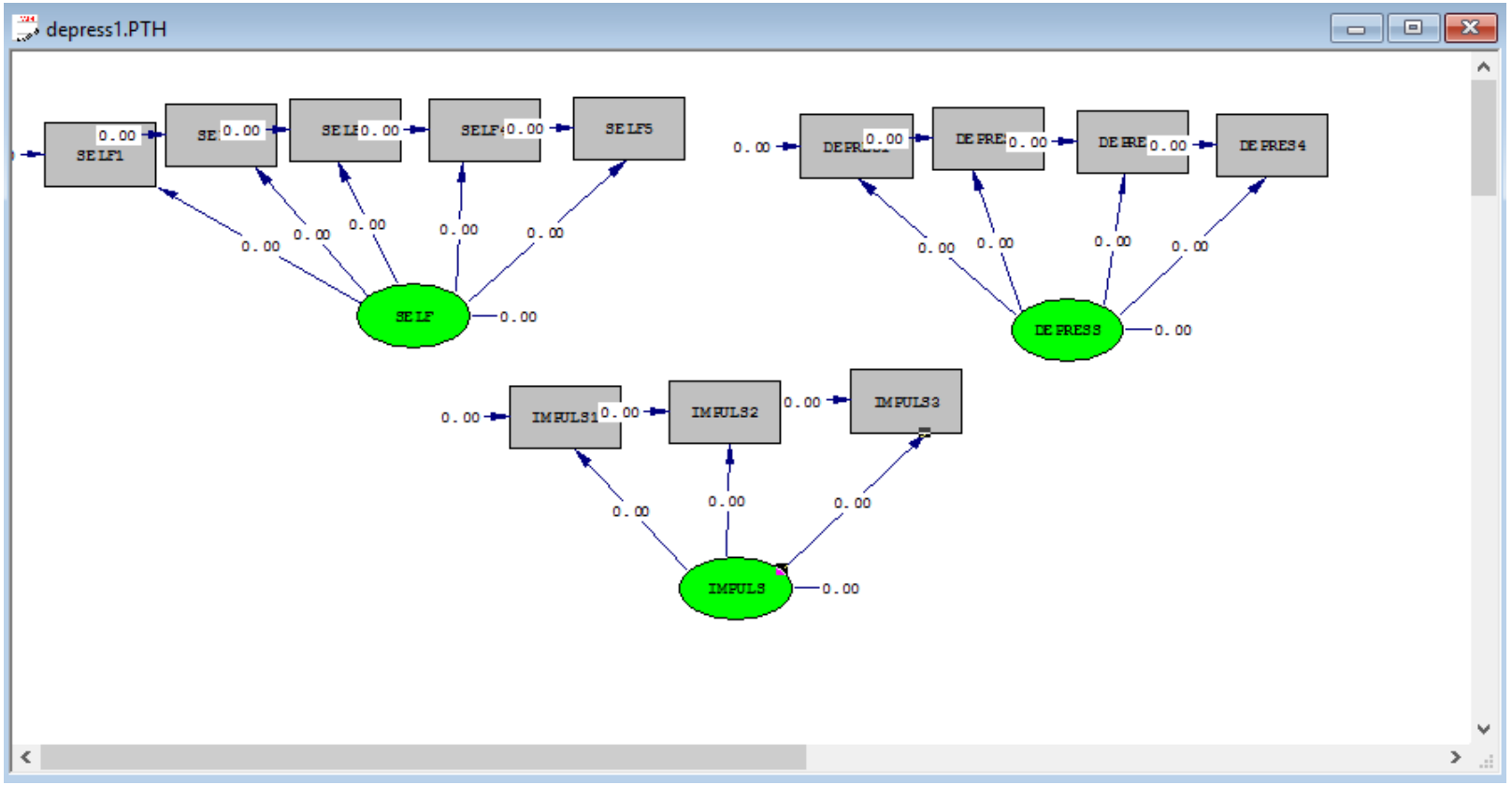
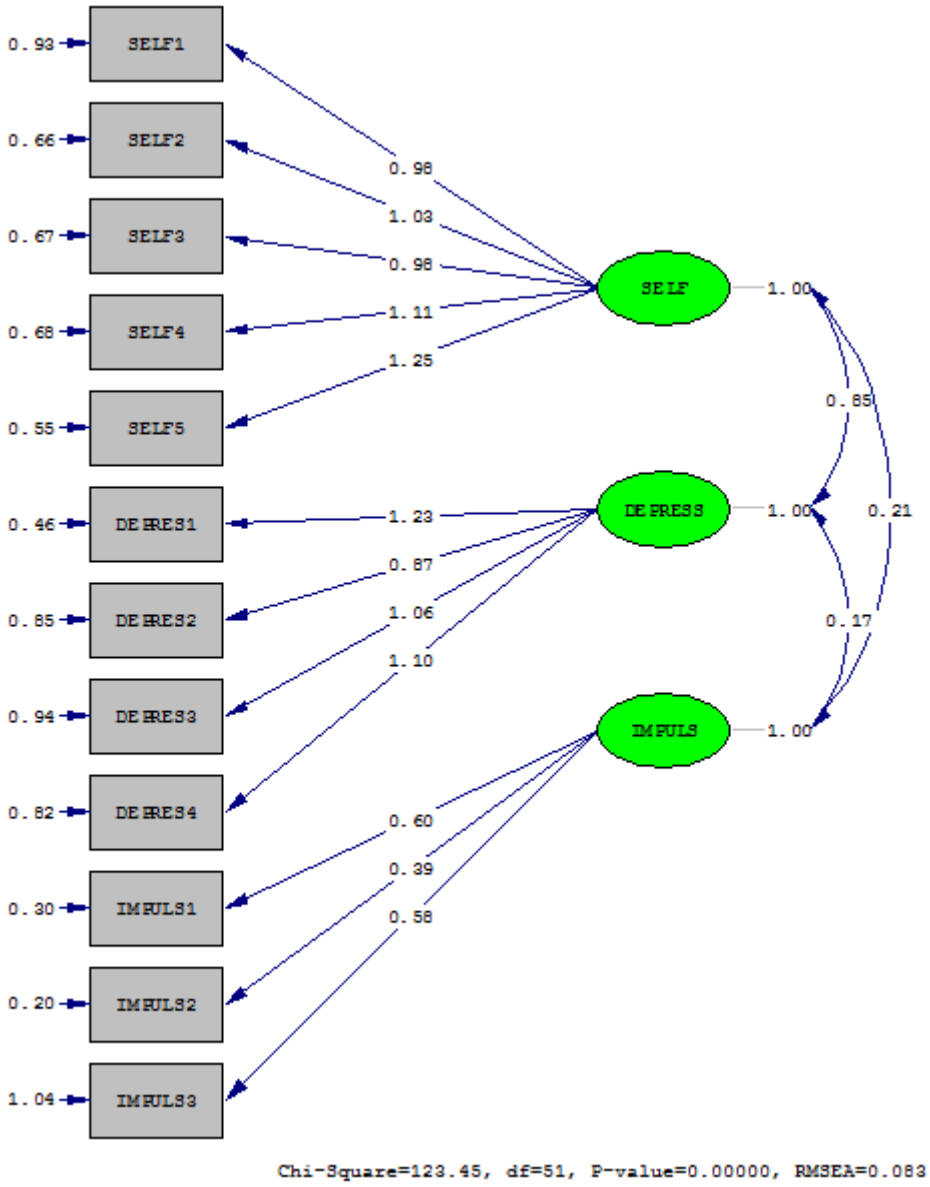
- Kreiranje diagrama poti:



- Kreiranje SIMPLIS sintakse:
  - Setup –> Build SIMPLIS Syntax
  - RUN LISREL.
- Nestandardizirane faktorske uteži



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- Sintakstna SIMPLIS datoteka depres3.SPL

```
Raw Data from file 'C:\LISREL9 Student Examples\TUTORIAL\depress.lsf'
Asymptotic Covariance Matrix from file Depress.acm
Latent Variables  Self Impuls Depress
Relationships
SELF1-SELF5  = Self
DEPRES1-DEPRES4 = Depress
IMPULS1-IMPULS3 = Impuls
Self = Impuls Depress
Impuls = Depress
Path Diagram
End of Problem
```

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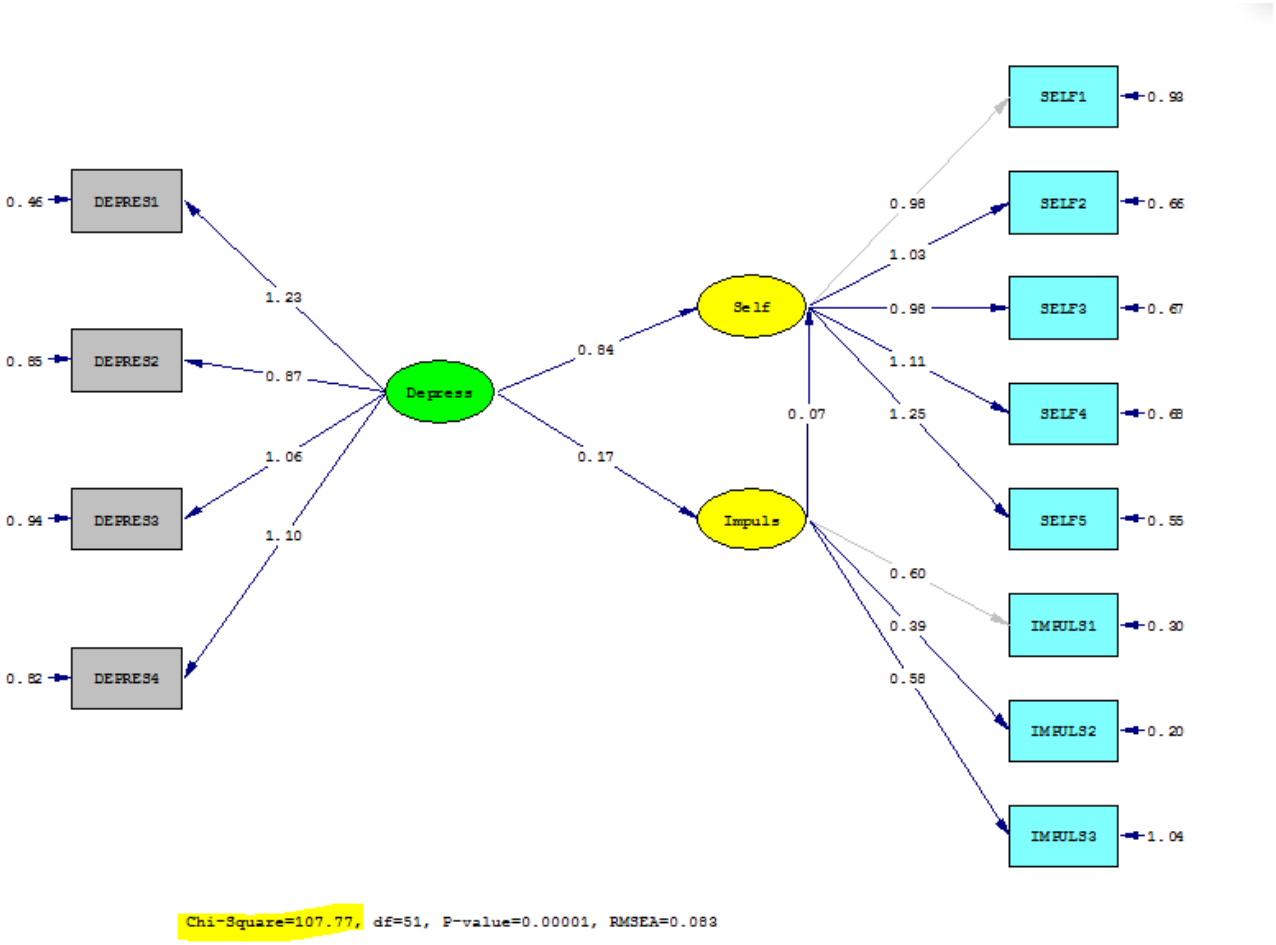
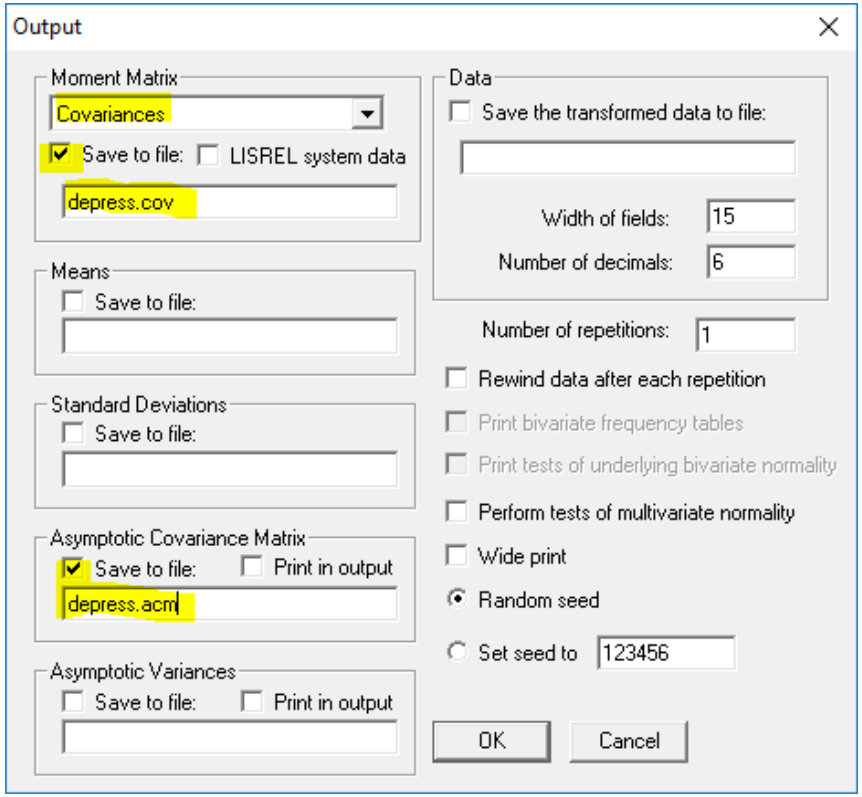
- Rezultat: HI-kvadrat je drugačen



6. Tehtani najmanjši kvadrati (*Weighted least squares* – WLS)

- Osnova je svobodna asimptotična distribucija (*Asymptotically Distribution Free* – ADF), kar je implementirano v LISREL kot tehtani najmanjši kvadrati (*Weighted Least Squares* – WLS).
- Potrebno je:
  - Asymptotic Covariance Matrix (ACM).
  - Kovatiance ali korelacije.



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- Path diagram

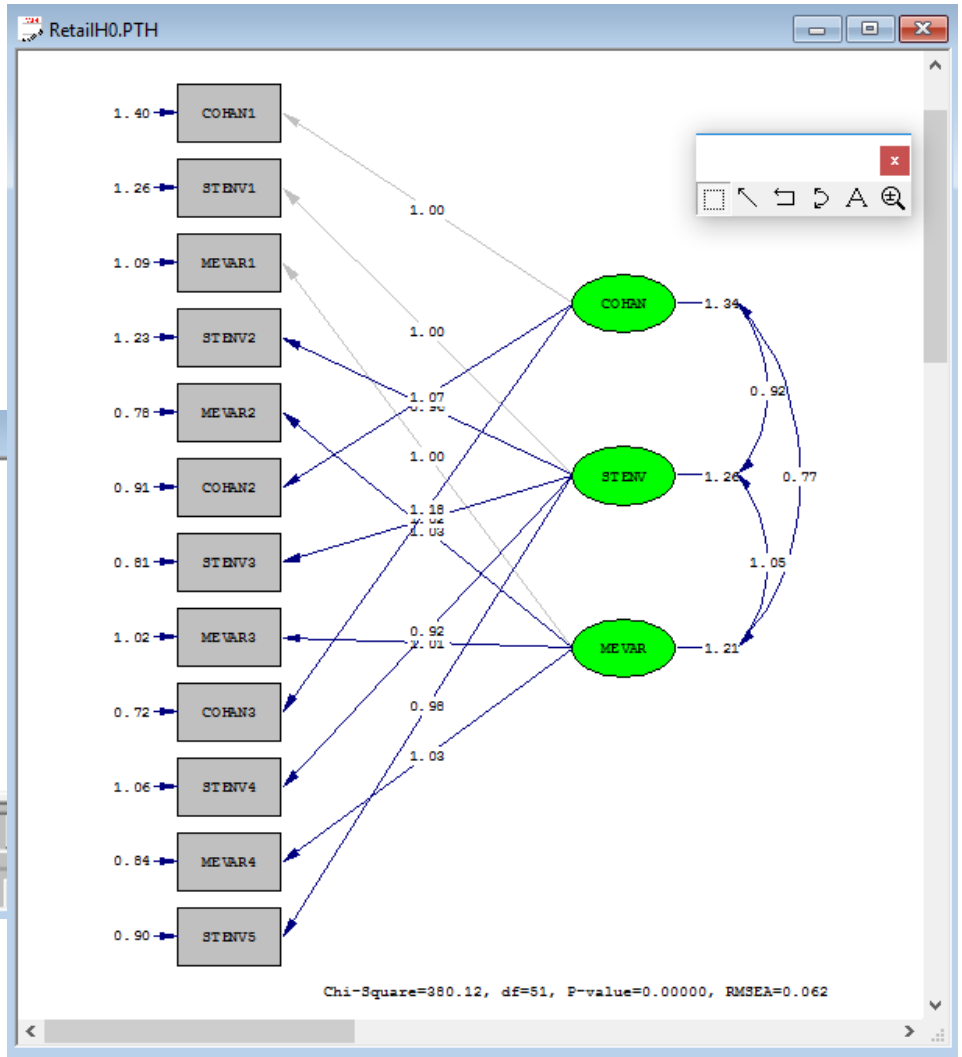
RetailH0.SPJ

```
Raw Data from File SAMPLE1.LSF
Latent Variables: COHAN STENV MEVAR
Relationships
COHAN1 = 1*COHAN
COHAN2 COHAN3 = COHAN
STENV1 = 1*STENV
STENV2 STENV3 STENV4 STENV5 = STENV
MEVAR1 = 1*MEVAR
MEVAR2 MEVAR3 MEVAR4 = MEVAR
Path Diagram
End of Problem
```

Observed Latent Groups

CONST VAR 1

From Set Path / × -



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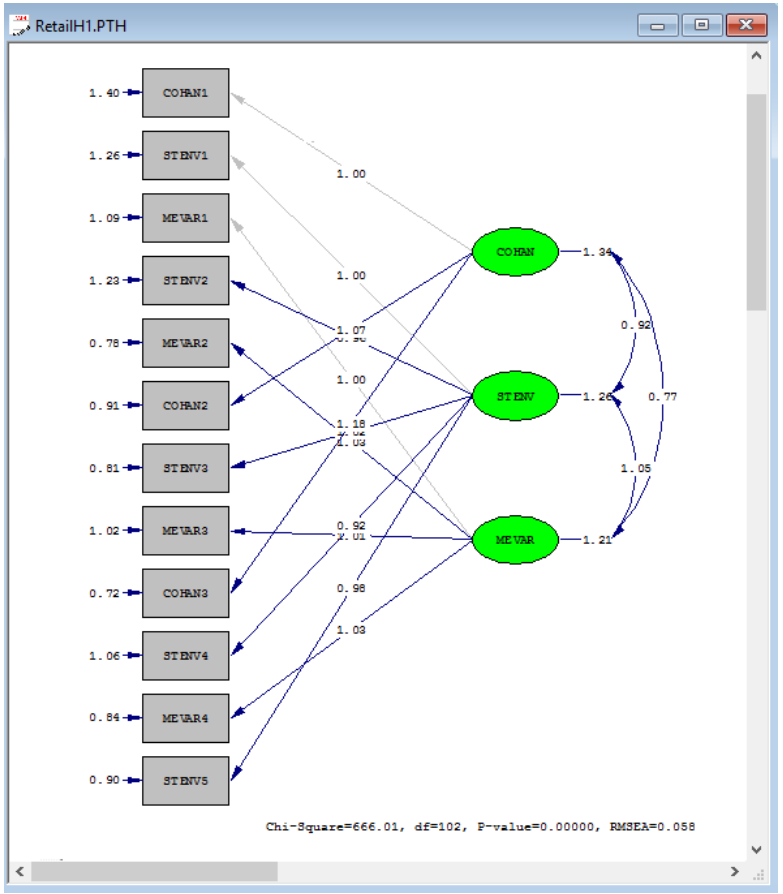
- RetailH1.SPL in Path diagram:
  - Definirane so variance faktorjev, kovariance faktorjev in merjene napake vaianc.

RetailH1.spl

```
Group 1: Original Sample
Raw Data from File SAMPLE1.LSF
Latent Variables: COHAN STENV MEVAR
Relationships
COHAN1 = 1*COHAN
COHAN2 COHAN3 = COHAN
STENV1 = 1*STENV
STENV2 STENV3 STENV4 STENV5 = STENV
MEVAR1 = 1*MEVAR
MEVAR2 MEVAR3 MEVAR4 = MEVAR
Group 2: Cross Validation Sample
Raw Data from File SAMPLE2.LSF
Relationships
COHAN1 = 1*COHAN
COHAN2 COHAN3 = COHAN
STENV1 = 1*STENV
STENV2 STENV3 STENV4 STENV5 = STENV
MEVAR1 = 1*MEVAR
MEVAR2 MEVAR3 MEVAR4 = MEVAR
Set the Variance of COHAN Free
Set the Variance of STENV Free
Set the Variance of MEVAR Free
Set the Covariance of COHAN-MEVAR Free
Set the Error Variance of COHAN1-COHAN3 Free
Set the Error Variance of STENV1-STENV5 Free
Set the Error Variance of MEVAR1-MEVAR4 Free
Path Diagram
End of Problem
```



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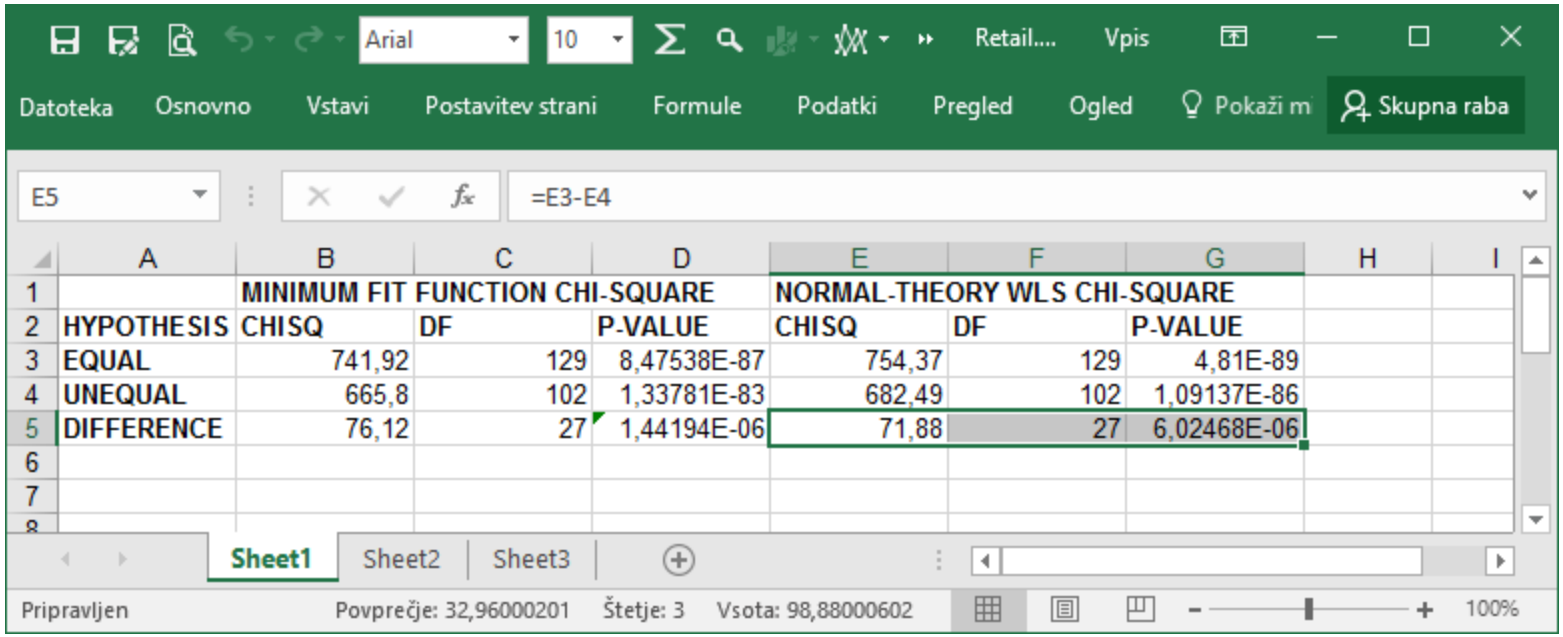
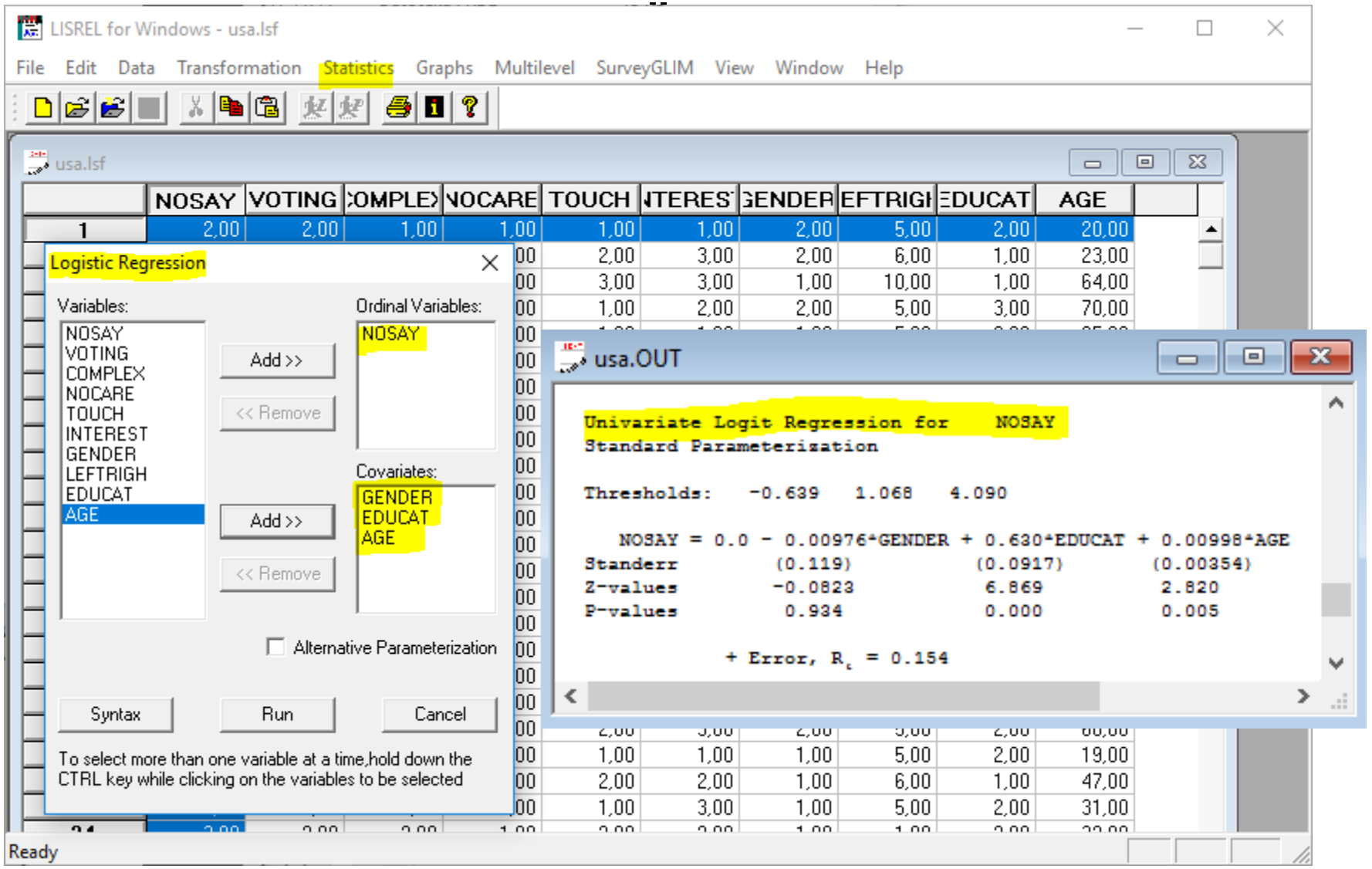
- HI-kvadrat test obeh modelov (Retail.XLS):



	A	B	C	D	E	F	G	H	I
1		MINIMUM FIT FUNCTION CHI-SQUARE			NORMAL-THEORY WLS CHI-SQUARE				
2	HYPOTHESIS	CHISQ	DF	P-VALUE	CHISQ	DF	P-VALUE		
3	EQUAL	741,92	129	8,47538E-87	754,37	129	4,81E-89		
4	UNEQUAL	665,8	102	1,33781E-83	682,49	102	1,09137E-86		
5	DIFFERENCE	76,12	27	1,44194E-06	71,88	27	6,02468E-06		
6									
7									

11 Logistična regresija (*Logistic regression analysis*)

- Podatki: usa.lsf.
  - Odvisna spremenljivka: NOSAY (Politična primernost).
  - Neodvisne spremenljivke:
    - EDUCAT: Izobrazba.
    - AGE: Starost.
    - GENDER: Spol.


LISREL for Windows - usa.lsf
File Edit Data Transformation Statistics Graphs Multilevel SurveyGLIM View Window Help
usa.lsf
NOSAY VOTING COMPLEX NOCARE TOUCH INTERES GENDER EFTRIGH EDUCAT AGE
Logistic Regression
Variables:
NOSAY
VOTING
COMPLEX
NOCARE
TOUCH
INTEREST
GENDER
LEFTRIGH
EDUCAT
AGE
Add >>
<< Remove
Ordinal Variables:
NOSAY
Add >>
<< Remove
Covariates:
GENDER
EDUCAT
AGE
Alternative Parameterization
Syntax
Run
Cancel
To select more than one variable at a time,hold down the CTRL key while clicking on the variables to be selected
usa.OUT
Univariate Logit Regression for NOSAY
Standard Parameterisation
Thresholds: -0.639 1.068 4.090
NOSAY = 0.0 - 0.00976*GENDER + 0.630*EDUCAT + 0.00998*AGE
Standerr (0.119) (0.0917) (0.00354)
Z-values -0.0823 6.869 2.820
P-values 0.934 0.000 0.005
+ Error, R = 0.154
Ready