

# Panel Data in EViews

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# Panel structured workfile

- ▶ EViews allows you to estimate panel equations using linear or nonlinear squares or instrumental variables (two-stage least squares), with correction for fixed or random effects in both the cross-section and period dimensions, AR errors, GLS weighting, and robust standard errors.
- ▶ BUT note that all of the estimators require a **panel structured workfile**.

# Creating panel structured workfile

Workfile Create

Workfile structure type

Balanced Panel

Panel specification

Frequency: Quarterly

Start date: 1970:1

End date: 2012:4

Number of cross sections: 20

Workfile names (optional)

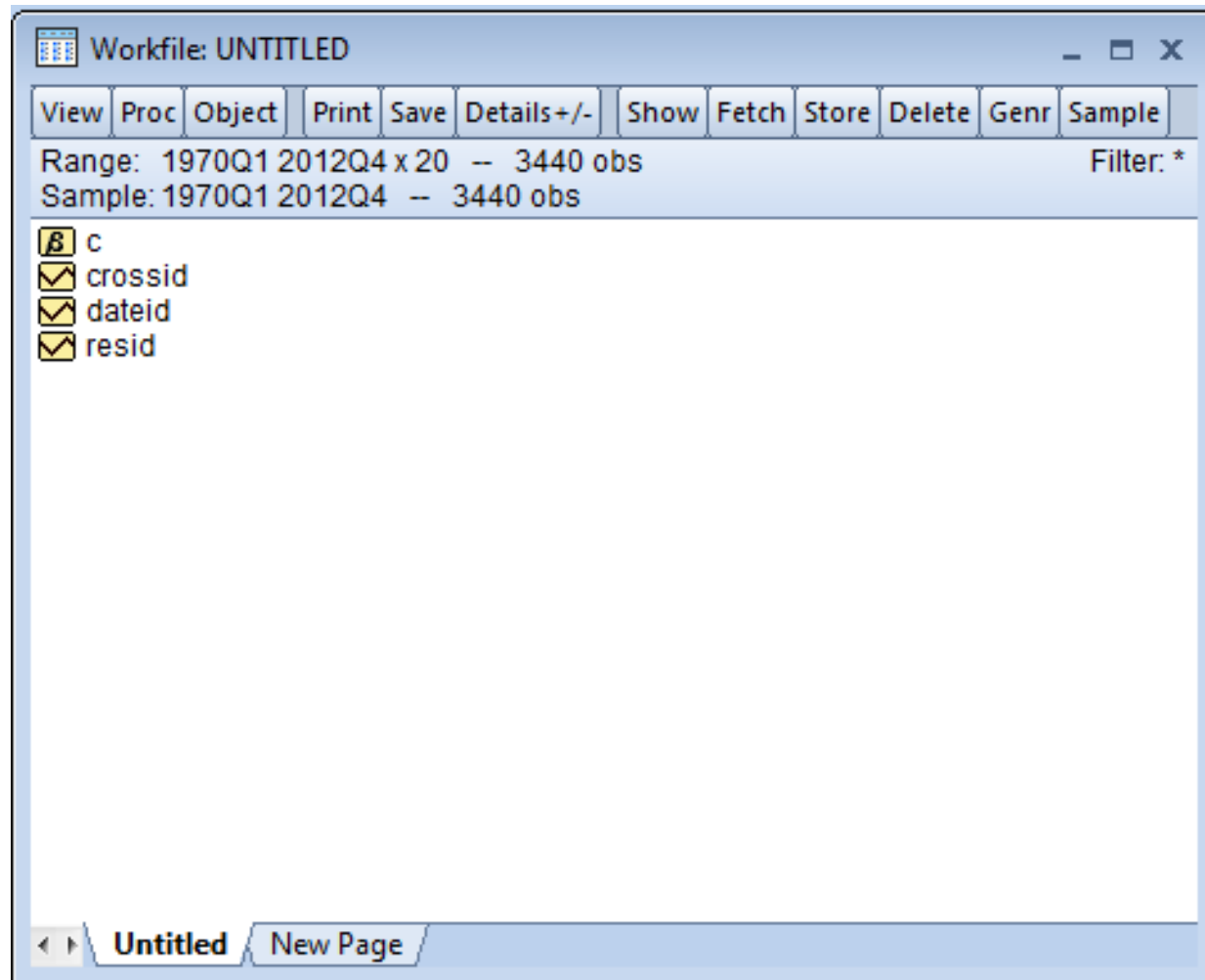
WF:

Page:

OK Cancel

Irregular Dated and Panel workfiles may be made from Unstructured workfiles by later specifying date and/or other identifier series.

# Workfile in Eviews



# File: Jtrain.WF1

- ▶ These data form a balanced panel of 3 annual observations on 157 firms.
- ▶ The data are first read into a 471 observation, unstructured EViews workfile.
- ▶ The values of the series YEAR and FCODE may be used to identify the date and cross-section, respectively, for each observation.

# Main Data

G File Edit Object View Proc Quick Option						
View	Proc	Object	Print	Name	Freeze	Default
obs	FCODE		YEAR			
1	410032		1987			
2	410032		1988			
3	410032		1989			
4	410440		1987			
5	410440		1988			
6	410440		1989			
7	410495		1987			
8	410495		1988			
9	410495		1989			
10	410500		1987			
11	410500		1988			
12	410500		1989			
13	410501		1987			
14	410501		1988			
15	410501		1989			
16	410509		1987			
17	410509		1988			
18	410509		1989			
19	410513		1987			
20	410513		1988			
21	410513		1989			
22	410517		1987			
23	410517		1988			
24	410517		1989			
25	410518		1987			

File Edit Object View Proc Quick Op						
G Group: UNTITLED Workfile: JTRAIN::Undat						
View	Proc	Object	Print	Name	Freeze	Defau
obs	FCODE		YEAR			
449	419461		1988			
450	419461		1989			
451	419467		1987			
452	419467		1988			
453	419467		1989			
454	419472		1987			
455	419472		1988			
456	419472		1989			
457	419473		1987			
458	419473		1988			
459	419473		1989			
460	419479		1987			
461	419479		1988			
462	419479		1989			
463	419482		1987			
464	419482		1988			
465	419482		1989			
466	419483		1987			
467	419483		1988			
468	419483		1989			
469	419486		1987			
470	419486		1988			
471	419486		1989			

# Creating a panel structure

- ▶ Proc→Structure/ Resize Current Page...

Workfile Structure

Workfile structure type: Dated Panel

Panel identifier series

Cross section ID series: fcode

Date series: year

Observation inclusion/creation

Frequency: Auto detect

Start date: @first

End date: @last

☒ Balance between starts & ends

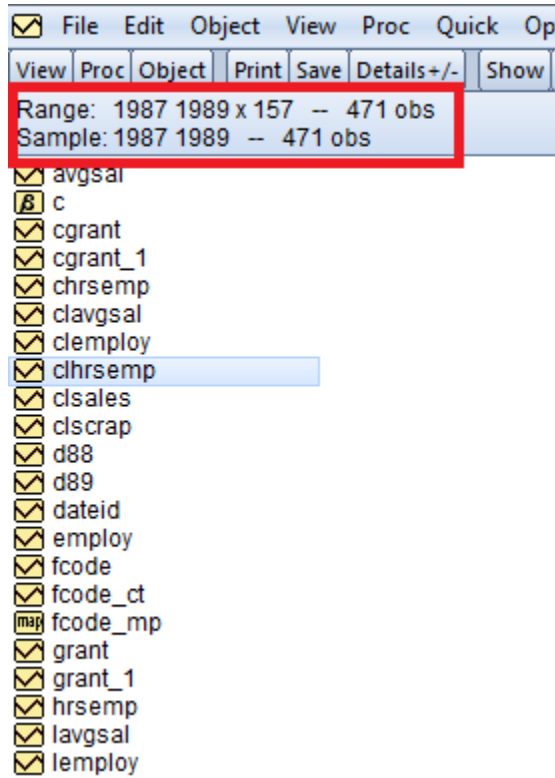
☐ Balance starts

☐ Balance ends

☐ Insert obs to remove date gaps so date follows regular frequency

OK Cancel

# Range



- ▶ For a dated panel workfile, it lists both the earliest and latest observed dates, the number of cross-sections, and the total number of unique observations.
- ▶ Here we see the top portion of an annual workfile with observations from 1987 to 1989 for 157 cross-sections.



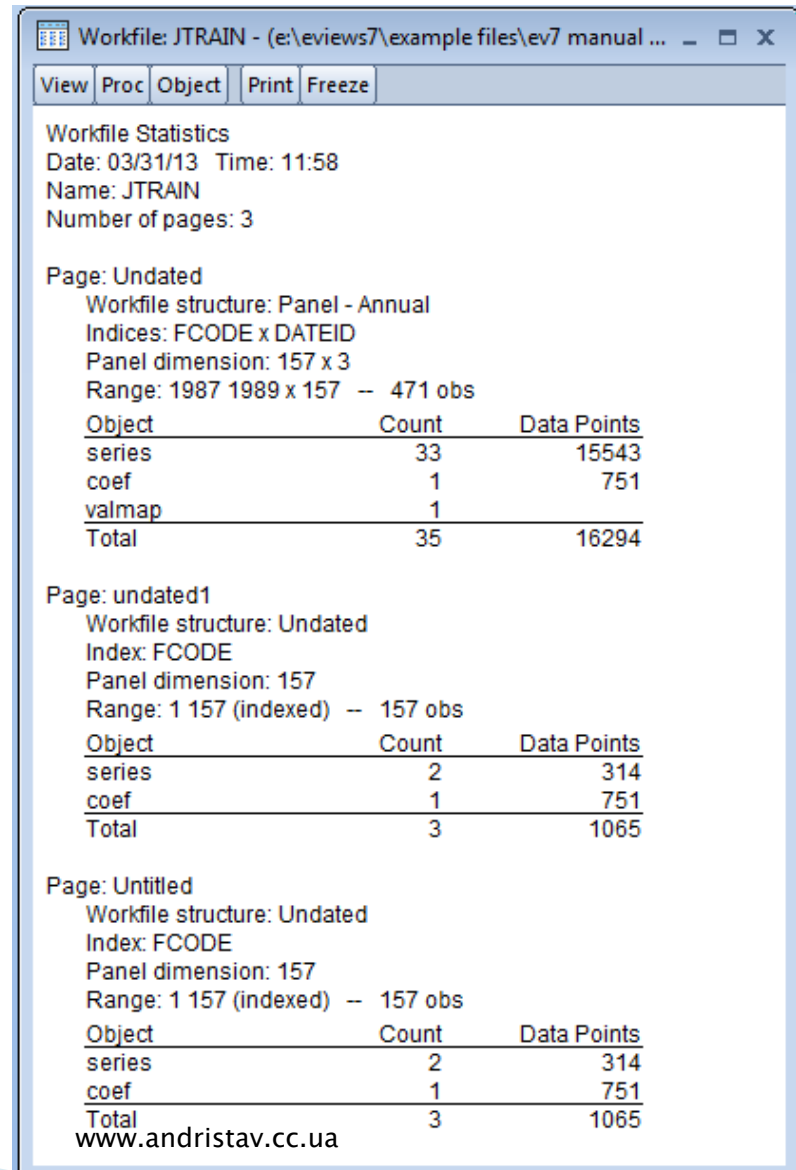
# Data

- ▶ The left-hand side of every workfile contains observation labels that identify each observation.

File Edit Object View Proc Quick Options			
View	Proc	Object	Properties
Print	Name	Freeze	Default
lavgsal - lavgsal[_n-1]			
Last updated: 08/18/99 - 02			
lavgsal - lavgsal[_n-1]			
Imported from 'C:\Documents and Settings			
410032 - 87	NA		
410032 - 88	-0.088949		
410032 - 89	0.130621		
410440 - 87	NA		
410440 - 88	0.233347		
410440 - 89	0.176382		
410495 - 87	NA		
410495 - 88	-1.919593		
410495 - 89	2.155982		
410500 - 87	NA		
410500 - 88	-0.188667		
410500 - 89	0.279253		
410501 - 87	NA		
410501 - 88	0.287682		
410501 - 89	0.223144		
410509 - 87	NA		
410509 - 88	NA		
410509 - 89	0.194156		
410513 - 87	NA		
410513 - 88	0.279238		
410513 - 89	-0.006215		
410517 - 87	NA		
410517 - 88	NA		
410517 - 89	NA		
410518 - 87	NA		

# Workfile Structure

- ▶ **View→Statistics** displays a summary of the structure and contents of your workfile.
- ▶ **View → Workfile Directory** displays the original workfile directory.



The screenshot shows the 'Workfile Statistics' window in EViews. The title bar reads 'Workfile: JTRAIN - (e:\evIEWS7\example files\ev7 manual ...'. The window has tabs for 'View', 'Proc', 'Object', 'Print', and 'Freeze'. The main content area displays statistics for the workfile 'JTRAIN'. It includes a summary of the workfile structure (Panel - Annual, Indices: FCODE x DATEID, Panel dimension: 157 x 3, Range: 1987 1989 x 157 -- 471 obs) and a table of objects. Below this, it shows statistics for 'Page: undated1' (Workfile structure: Undated, Index: FCODE, Panel dimension: 157, Range: 1 157 (indexed) -- 157 obs) and another table of objects. At the bottom, it shows statistics for 'Page: Untitled' (Workfile structure: Undated, Index: FCODE, Panel dimension: 157, Range: 1 157 (indexed) -- 157 obs) and a third table of objects. The URL 'www.andristav.cc.ua' is visible at the bottom of the window.

Object	Count	Data Points
series	33	15543
coef	1	751
valmap	1	
Total	35	16294

Object	Count	Data Points
series	2	314
coef	1	751
Total	3	1065

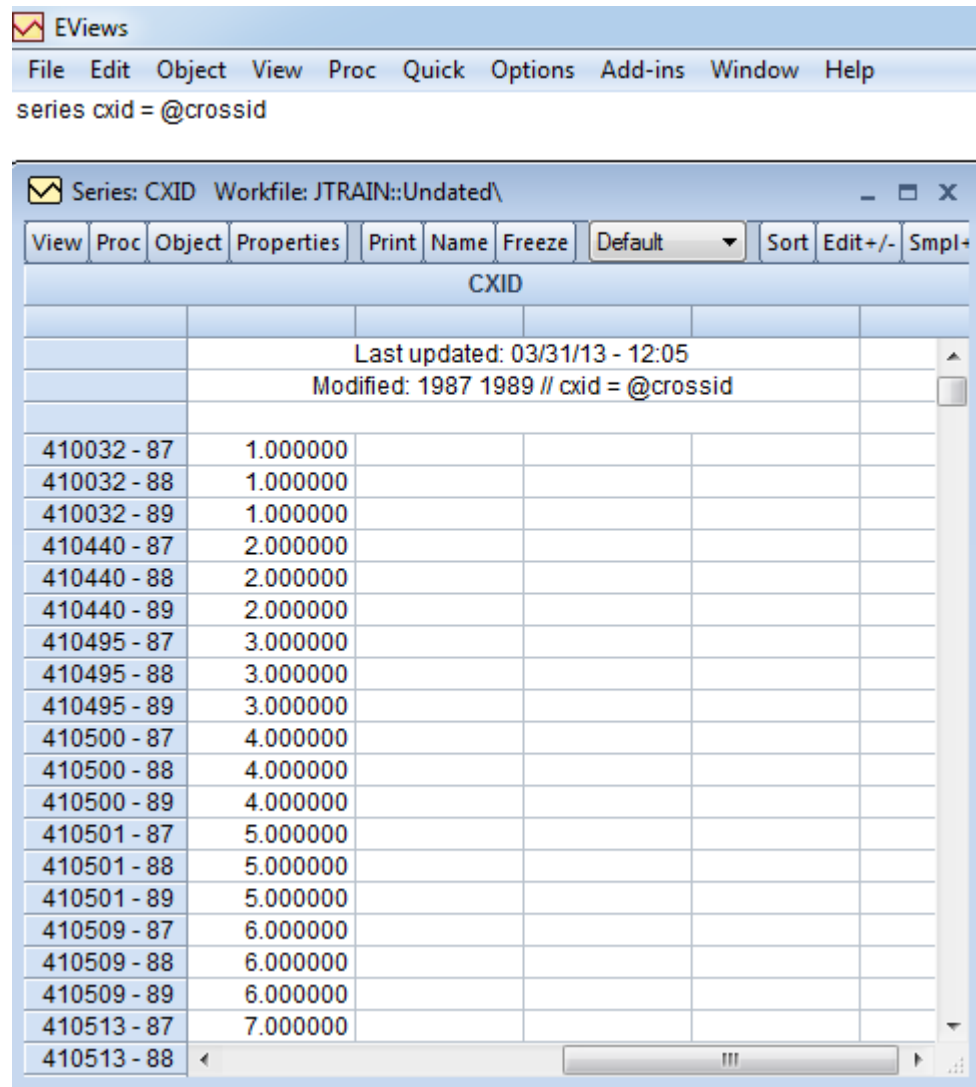
  

Object	Count	Data Points
series	2	314
coef	1	751
Total	3	1065

www.andristav.cc.ua

# Cross-section Index – 1

- ▶ The series expression `@crossid` provides index identifiers for each observation corresponding to the cross-section to which the observation belongs.

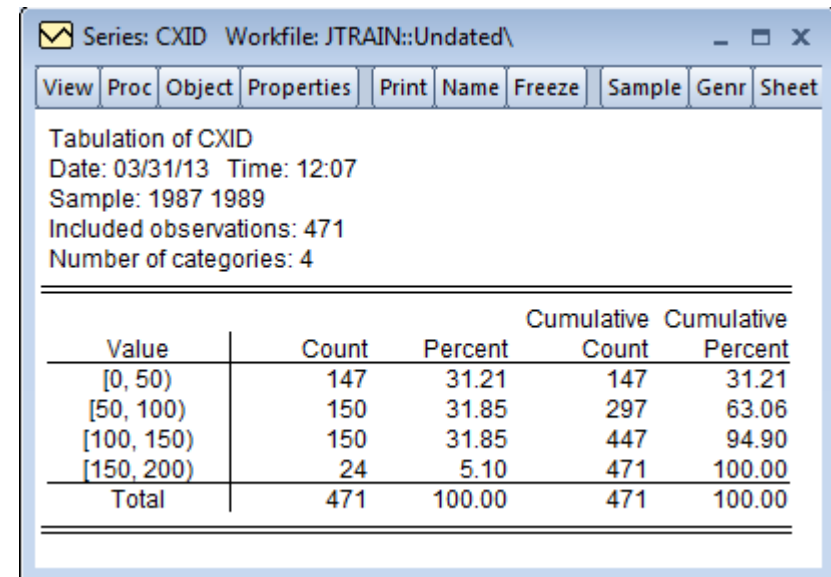


The screenshot shows the EViews software interface. The main window displays a series named 'CXID' from the 'JTRAIN::Undated\'. The series is defined by the expression `series cxid = @crossid`. The data is presented in a table with two columns: the first column lists observation identifiers (e.g., 410032 - 87) and the second column shows the corresponding cross-section index values (e.g., 1.000000). The table is sorted by the index values, which range from 1.000000 to 7.000000. The window also shows the last update time as 03/31/13 - 12:05 and the modification date as 1987 1989 // cxid = @crossid.

Observation	CXID
410032 - 87	1.000000
410032 - 88	1.000000
410032 - 89	1.000000
410440 - 87	2.000000
410440 - 88	2.000000
410440 - 89	2.000000
410495 - 87	3.000000
410495 - 88	3.000000
410495 - 89	3.000000
410500 - 87	4.000000
410500 - 88	4.000000
410500 - 89	4.000000
410501 - 87	5.000000
410501 - 88	5.000000
410501 - 89	5.000000
410509 - 87	6.000000
410509 - 88	6.000000
410509 - 89	6.000000
410513 - 87	7.000000
410513 - 88	7.000000

# Cross-section Index – 2

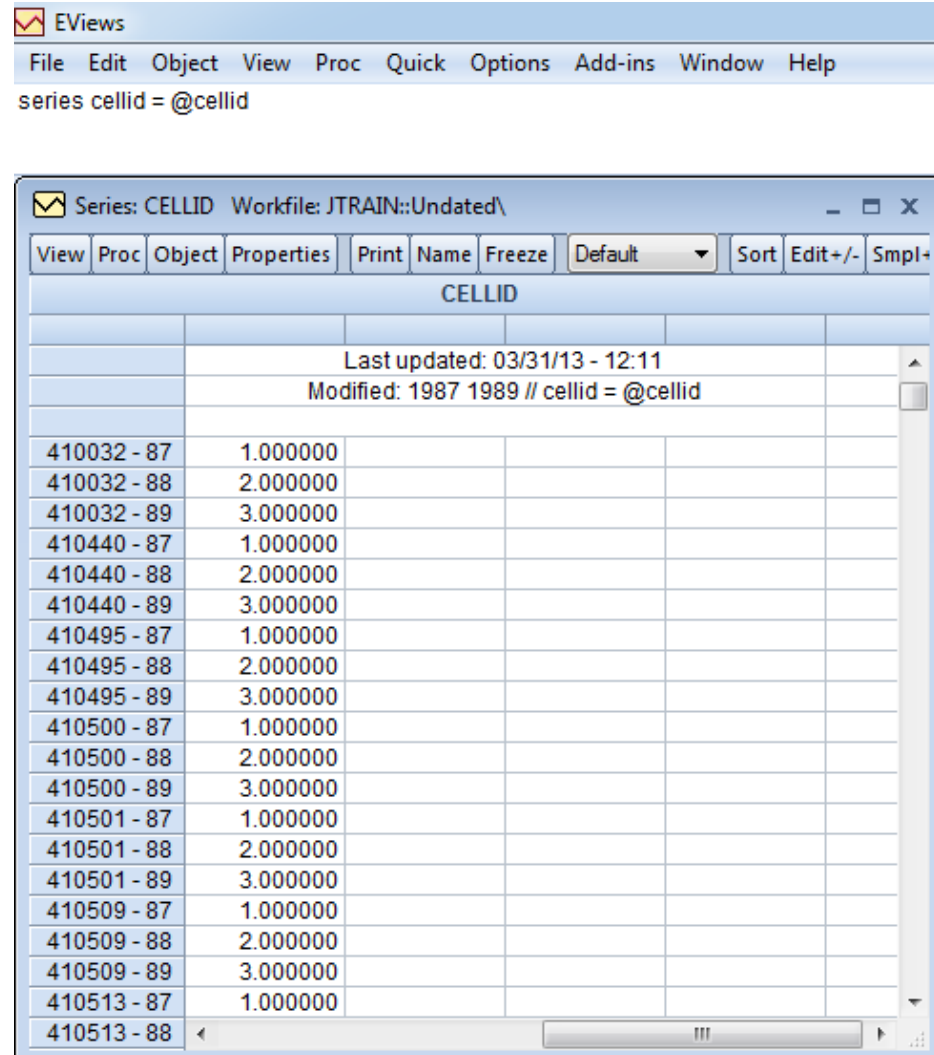
- ▶ A one-way tabulation of the CXID series shows the number of observations in each cross-section or group



Value	Count	Percent	Cumulative Count	Cumulative Percent
[0, 50)	147	31.21	147	31.21
[50, 100)	150	31.85	297	63.06
[100, 150)	150	31.85	447	94.90
[150, 200)	24	5.10	471	100.00
Total	471	100.00	471	100.00

# Cell Index – 1

- ▶ @cellid may be used to obtain integers uniquely indexing cell IDs.
- ▶ @cellid numbers observations using an index corresponding to the ordered unique values of the cell or date ID values.
- ▶ Note that since the indexing uses all unique values of the cell or date ID series, the observations within a cross-section may be indexed non-sequentially.



EViews

File Edit Object View Proc Quick Options Add-ins Window Help

series cellid = @cellid

Series: CELLID Workfile: JTRAIN::Undated\

View Proc Object Properties Print Name Freeze Default Sort Edit+/- Smpl+

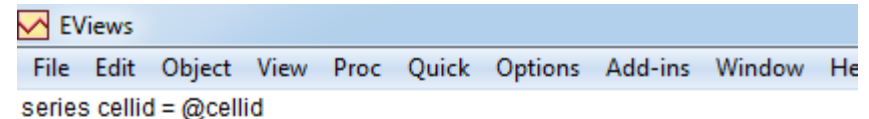
CELLID

Last updated: 03/31/13 - 12:11  
Modified: 1987 1989 // cellid = @cellid

410032 - 87	1.000000			
410032 - 88	2.000000			
410032 - 89	3.000000			
410440 - 87	1.000000			
410440 - 88	2.000000			
410440 - 89	3.000000			
410495 - 87	1.000000			
410495 - 88	2.000000			
410495 - 89	3.000000			
410500 - 87	1.000000			
410500 - 88	2.000000			
410500 - 89	3.000000			
410501 - 87	1.000000			
410501 - 88	2.000000			
410501 - 89	3.000000			
410509 - 87	1.000000			
410509 - 88	2.000000			
410509 - 89	3.000000			
410513 - 87	1.000000			
410513 - 88				

# Cell Index – 2

- ▶ A one-way tabulation of the CELLID series provides you with information about the number of observations with each index value:



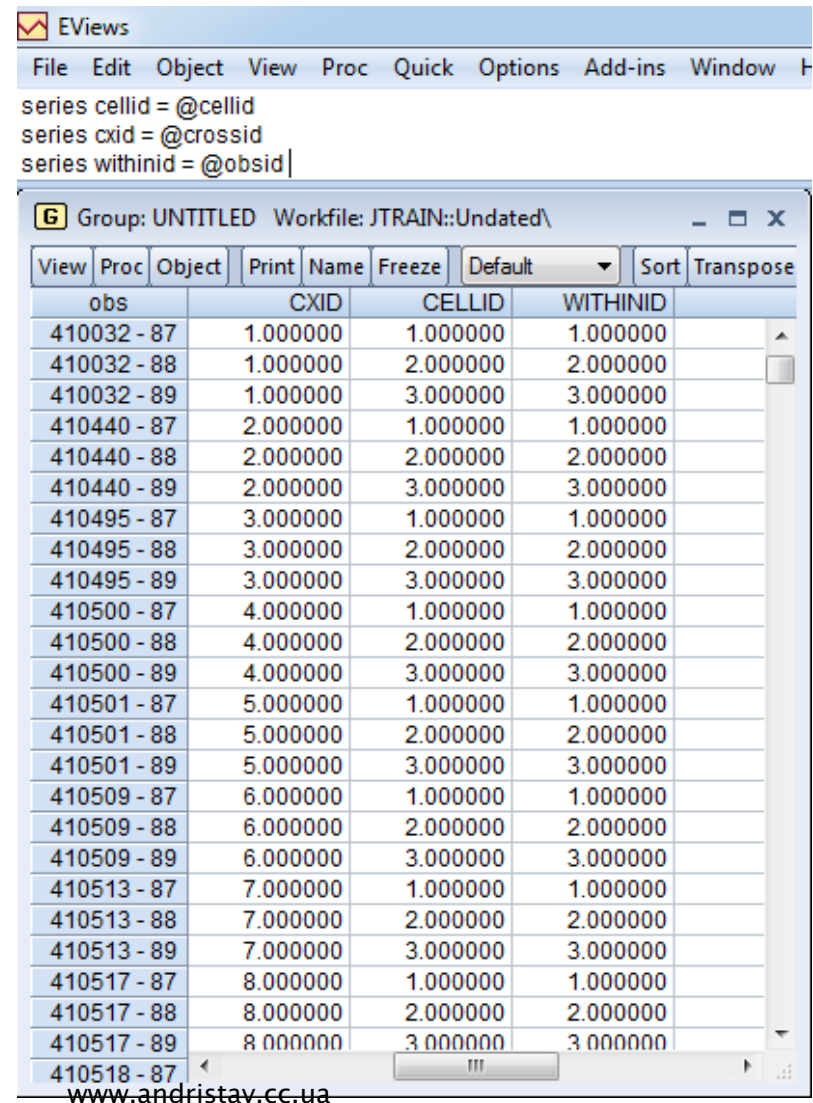
The screenshot shows the 'Series: CELLID' tabulation window. The title bar indicates the workfile is 'JTRAIN::Undated\'. The window contains a summary of the tabulation and a table of results.

Tabulation of CELLID  
Date: 03/31/13 Time: 12:12  
Sample: 1987 1989  
Included observations: 471  
Number of categories: 3

Value	Count	Percent	Cumulative Count	Cumulative Percent
1	157	33.33	157	33.33
2	157	33.33	314	66.67
3	157	33.33	471	100.00
Total	471	100.00	471	100.00

# Within Cross-section Observation Index

- ▶ `@obsid` returns an integer uniquely indexing observations within a cross-section. The observations will be numbered sequentially from 1 through the number of observations in the corresponding cross-section.
- ▶ `@cellid` uses information about all of the ID values in creating its index.
- ▶ `@obsid` only uses the ordered observations within a cross-section in forming the index.



The screenshot shows the EViews software interface. At the top, the menu bar includes File, Edit, Object, View, Proc, Quick, Options, Add-ins, Window, and Help. Below the menu bar, the command window displays the following series definitions:

```
series cellid = @cellid  
series cxid = @crossid  
series withinid = @obsid
```

The main window shows a workfile titled "UNTITLED" with the path "JTRAIN::Undated\". The workfile contains a table with the following columns: obs, CXID, CELLID, and WITHINID. The table lists 24 observations, each with a unique ID value in the 'obs' column and corresponding values in the other columns.

obs	CXID	CELLID	WITHINID
410032 - 87	1.000000	1.000000	1.000000
410032 - 88	1.000000	2.000000	2.000000
410032 - 89	1.000000	3.000000	3.000000
410440 - 87	2.000000	1.000000	1.000000
410440 - 88	2.000000	2.000000	2.000000
410440 - 89	2.000000	3.000000	3.000000
410495 - 87	3.000000	1.000000	1.000000
410495 - 88	3.000000	2.000000	2.000000
410495 - 89	3.000000	3.000000	3.000000
410500 - 87	4.000000	1.000000	1.000000
410500 - 88	4.000000	2.000000	2.000000
410500 - 89	4.000000	3.000000	3.000000
410501 - 87	5.000000	1.000000	1.000000
410501 - 88	5.000000	2.000000	2.000000
410501 - 89	5.000000	3.000000	3.000000
410509 - 87	6.000000	1.000000	1.000000
410509 - 88	6.000000	2.000000	2.000000
410509 - 89	6.000000	3.000000	3.000000
410513 - 87	7.000000	1.000000	1.000000
410513 - 88	7.000000	2.000000	2.000000
410513 - 89	7.000000	3.000000	3.000000
410517 - 87	8.000000	1.000000	1.000000
410517 - 88	8.000000	2.000000	2.000000
410517 - 89	8.000000	3.000000	3.000000
410518 - 87			

The URL [www.andristav.cc.ua](http://www.andristav.cc.ua) is visible at the bottom of the screenshot.



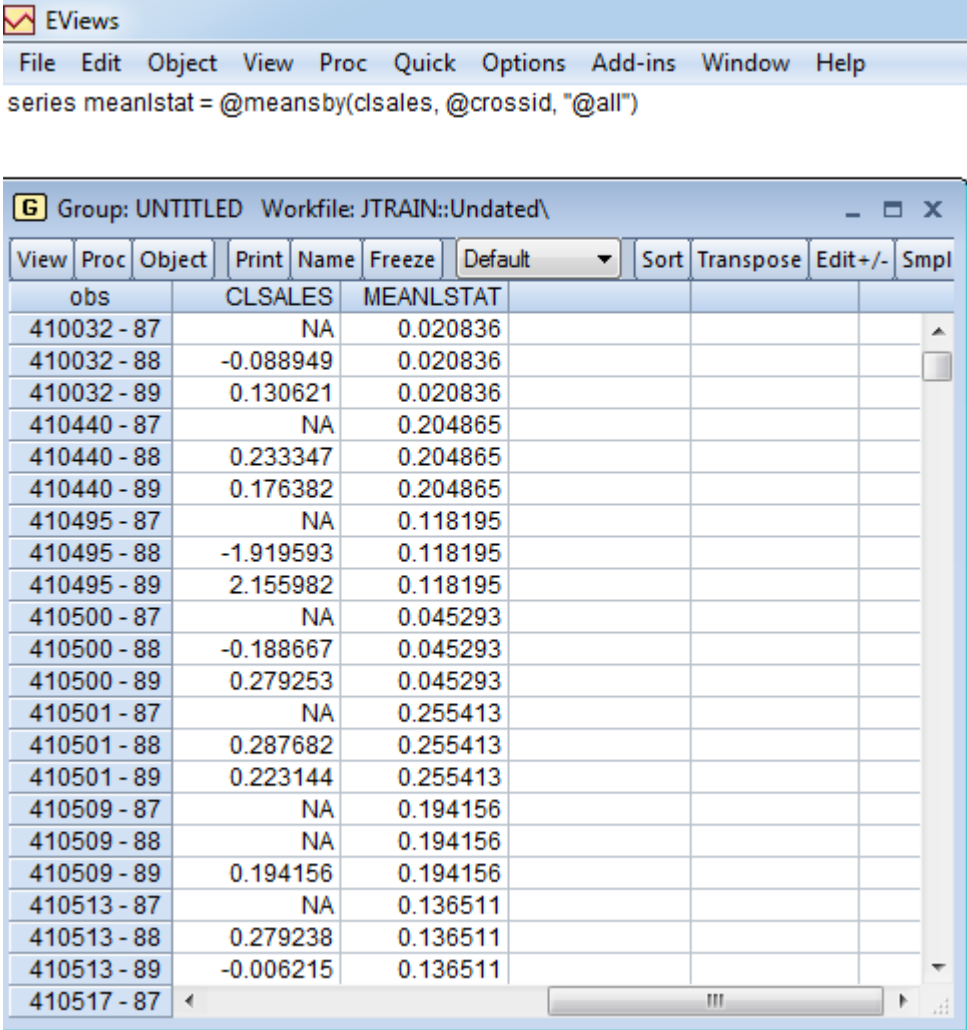
# Trends

- ▶ EViews provides several functions that may be used to construct a time trend in your panel structured workfile. A trend in a panel workfile has the property that the values are initialized at the start of a cross-section, increase for successive observations in the specific cross-section, and are reset at the start of the next cross section.
  - The **@obsid** function may be used to return the simplest notion of a trend in which the values for each cross-section begin at one and increase by one for successive observations in the cross-section.
  - The **@trendc** function computes trends in which values for observations with the earliest observed date are normalized to zero, and values for successive observations are incremented based on the calendar associated with the workfile frequency.
  - The **@cellid** and **@trend** functions return time trends in which the values increase based on a calendar defined by the observed dates in the workfile.



# Means

- ▶ If you wish to assign to each observation in the workfile the mean value of LSALES by the trains, you may perform:



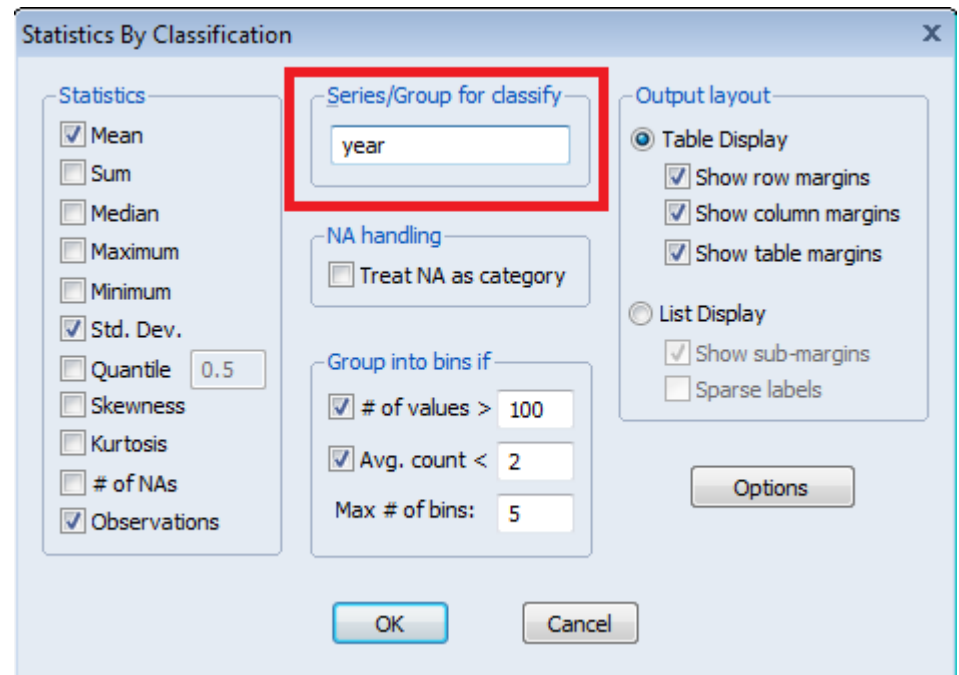
The screenshot shows the EViews software interface. The top menu bar includes File, Edit, Object, View, Proc, Quick, Options, Add-ins, Window, and Help. Below the menu bar, a command line displays the series definition: `series meanlstat = @meansby(clsales, @crossid, "@all")`.

The main window displays a table with the following data:

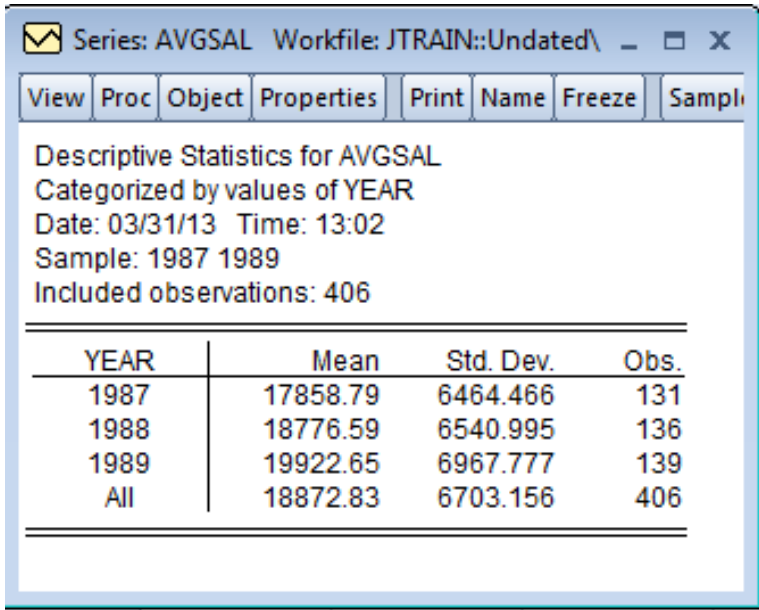
obs	CLSALLES	MEANLSTAT
410032 - 87	NA	0.020836
410032 - 88	-0.088949	0.020836
410032 - 89	0.130621	0.020836
410440 - 87	NA	0.204865
410440 - 88	0.233347	0.204865
410440 - 89	0.176382	0.204865
410495 - 87	NA	0.118195
410495 - 88	-1.919593	0.118195
410495 - 89	2.155982	0.118195
410500 - 87	NA	0.045293
410500 - 88	-0.188667	0.045293
410500 - 89	0.279253	0.045293
410501 - 87	NA	0.255413
410501 - 88	0.287682	0.255413
410501 - 89	0.223144	0.255413
410509 - 87	NA	0.194156
410509 - 88	NA	0.194156
410509 - 89	0.194156	0.194156
410513 - 87	NA	0.136511
410513 - 88	0.279238	0.136511
410513 - 89	-0.006215	0.136511
410517 - 87		

# Viewing Summaries – 1

- ▶ The easiest way to compute by-group statistics is to use **View→Descriptive Statistics & Tests→Stats by Classification...**



# Viewing Summaries – 2



Series: AVGSAL Workfile: JTRAIN::Undated\

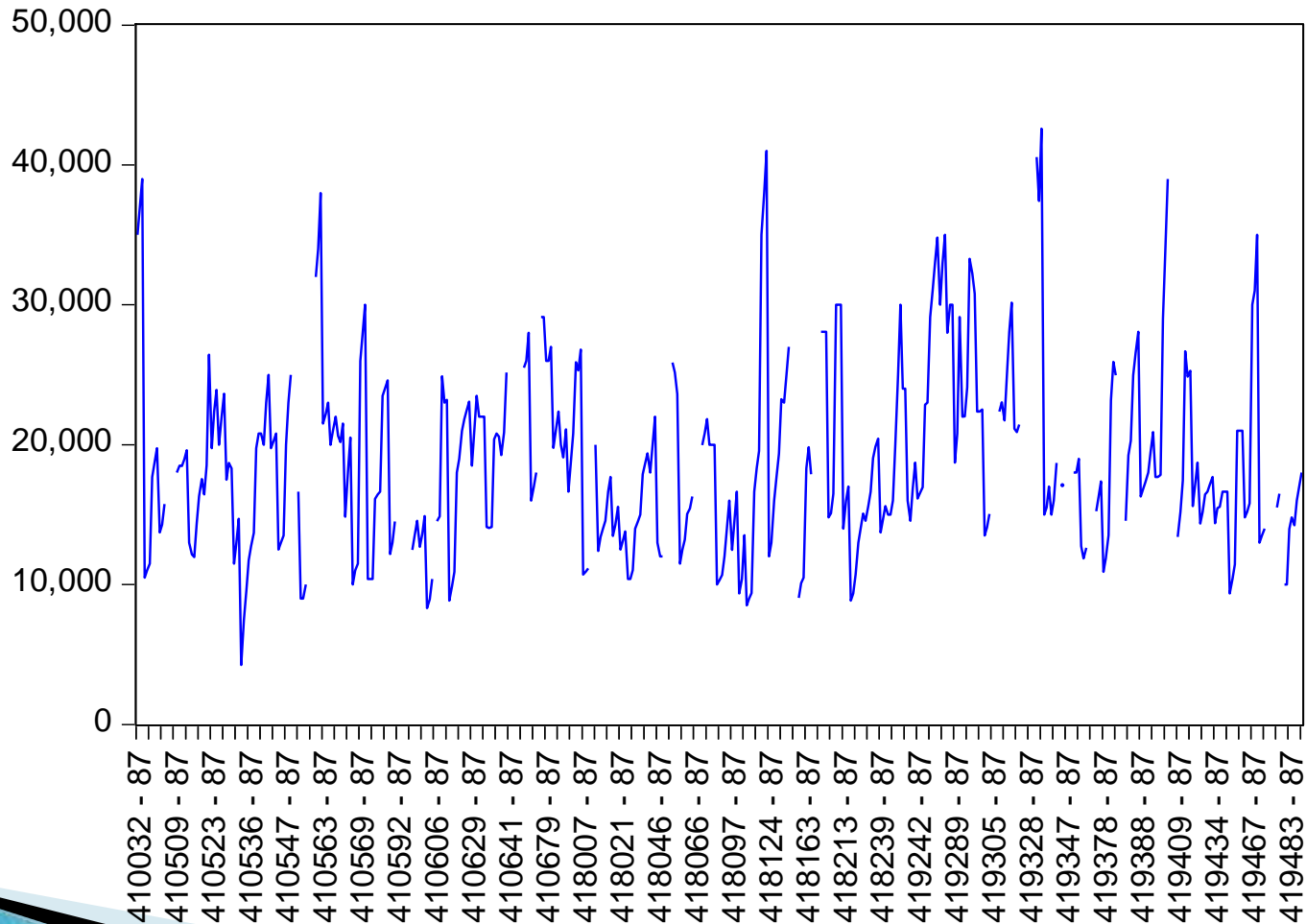
View Proc Object Properties Print Name Freeze Sample

Descriptive Statistics for AVGSAL  
Categorized by values of YEAR  
Date: 03/31/13 Time: 13:02  
Sample: 1987 1989  
Included observations: 406

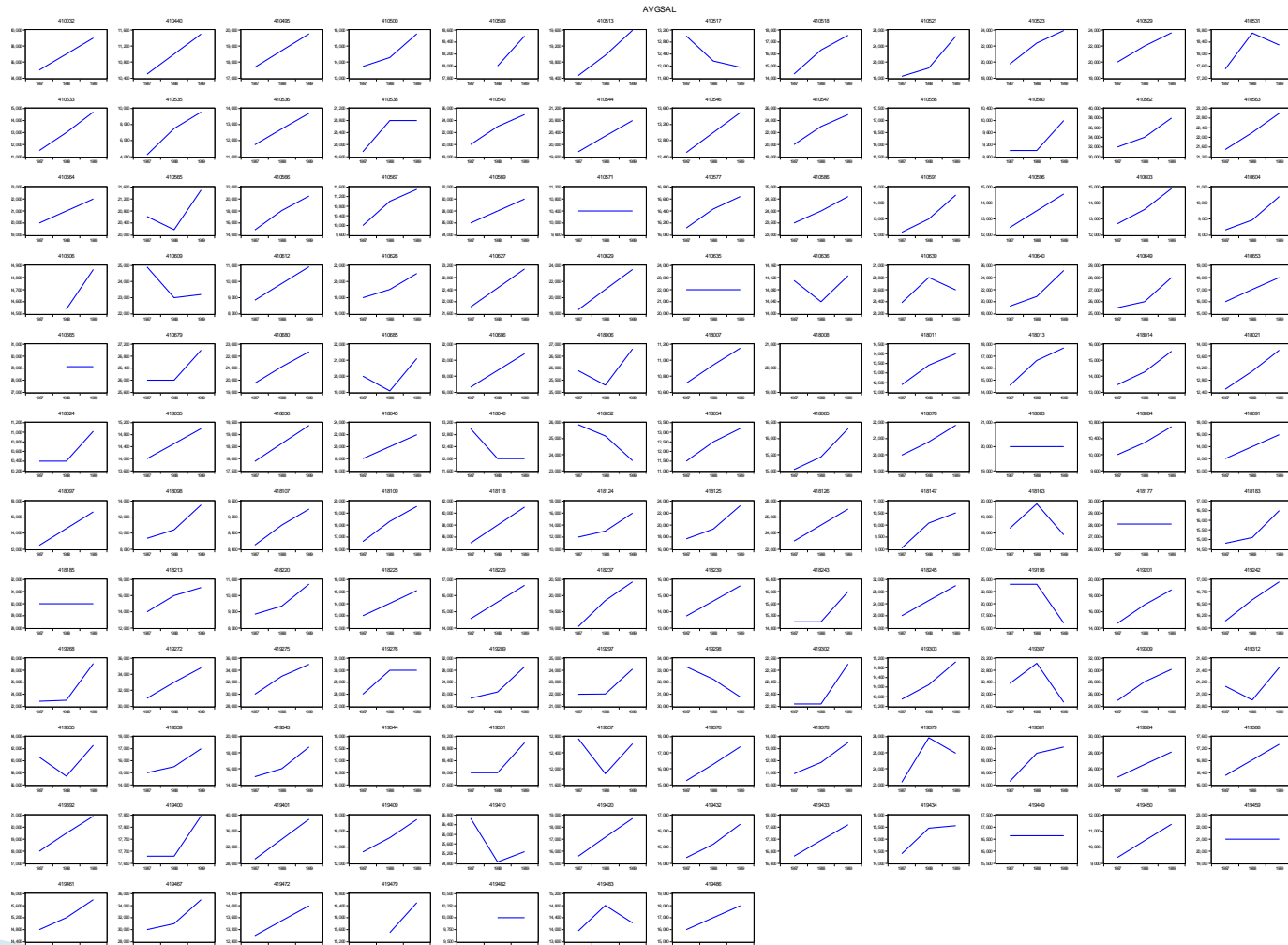
YEAR	Mean	Std. Dev.	Obs.
1987	17858.79	6464.466	131
1988	18776.59	6540.995	136
1989	19922.65	6967.777	139
All	18872.83	6703.156	406

# Time Series Graphs: Stack cross sections

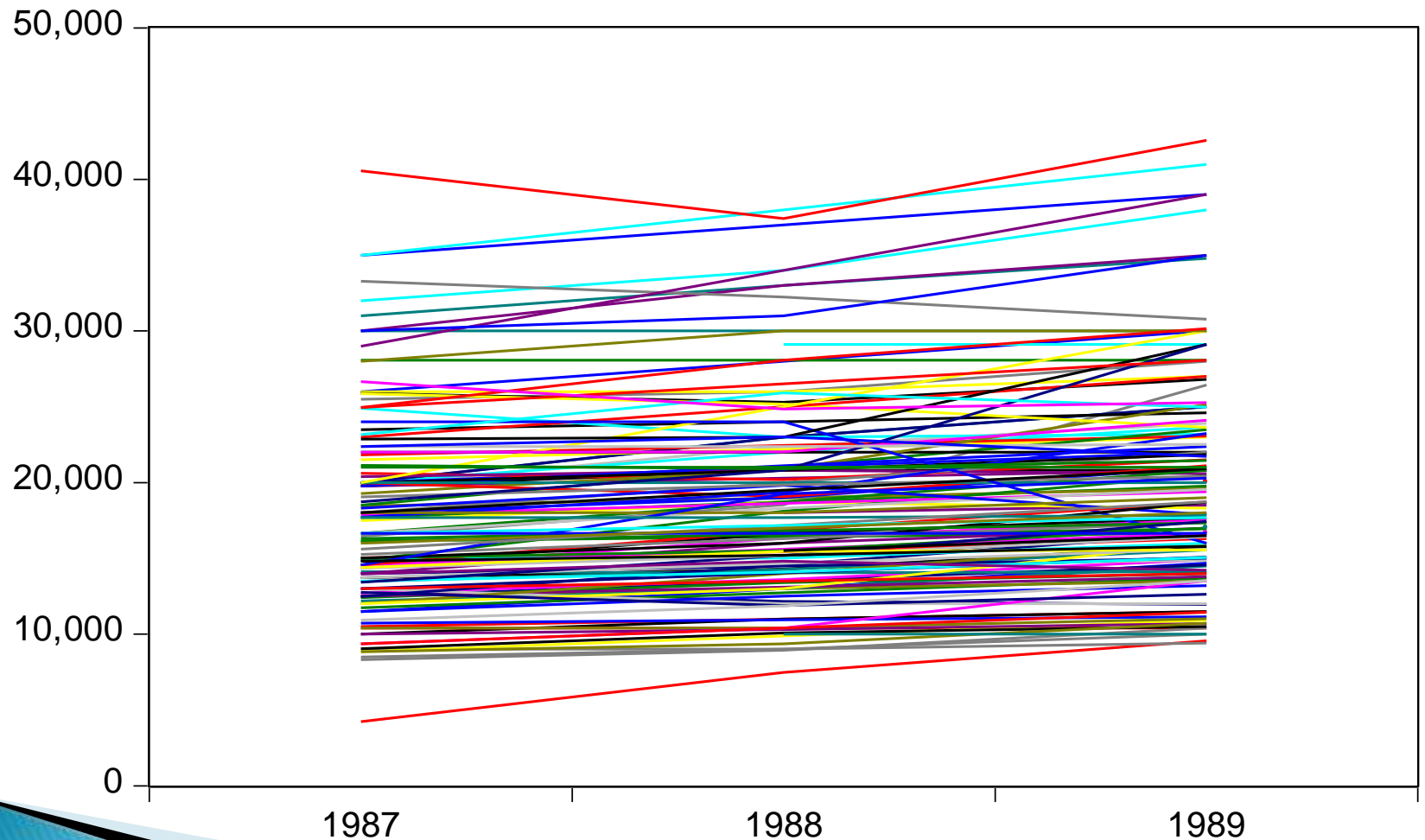
AVGSAL



# Time Series Graphs: Individual cross sections

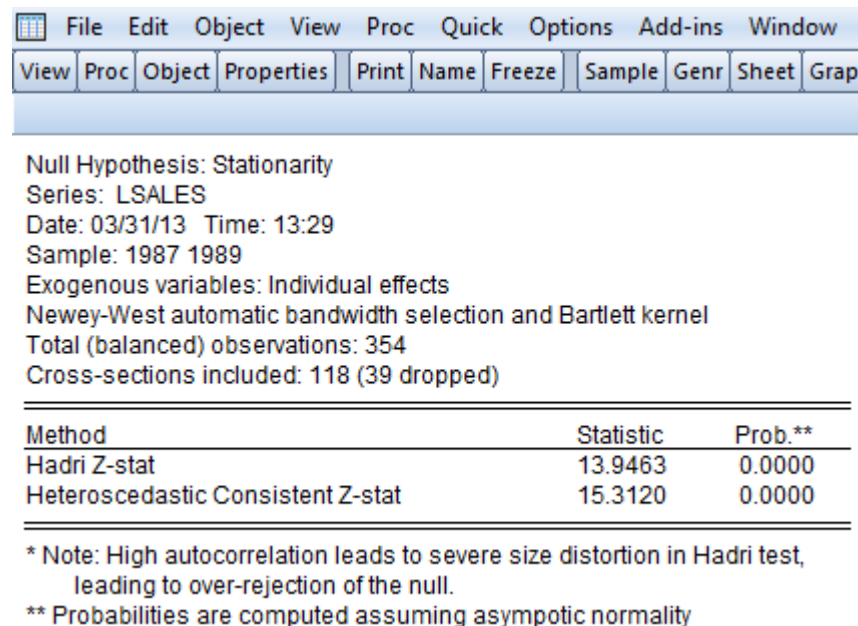


# Time Series Graphs: Combined cross sections



# Panel Unit Root Tests

- ▶ To compute the unit root test on a series, select **View→Unit Root Test...**
- ▶ By default, EViews will compute a **Summary** of all of the first five unit root tests, where applicable, but you may use the combo box in the upper left hand corner to select an individual test statistic.

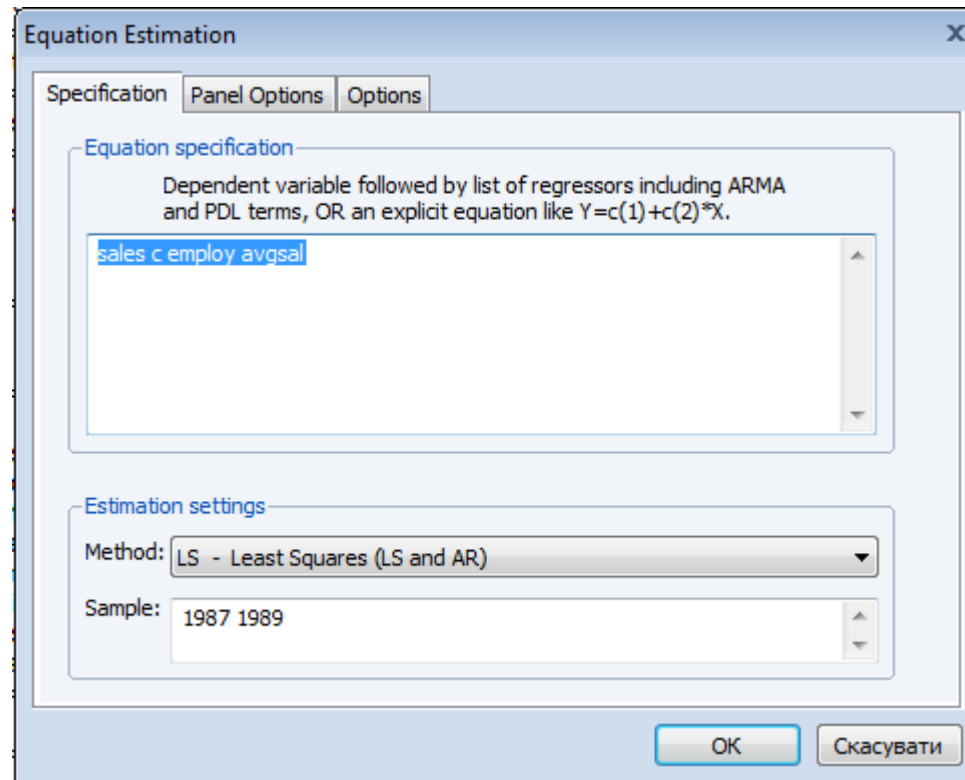


Null Hypothesis: Stationarity  
Series: LSALES  
Date: 03/31/13 Time: 13:29  
Sample: 1987 1989  
Exogenous variables: Individual effects  
Newey-West automatic bandwidth selection and Bartlett kernel  
Total (balanced) observations: 354  
Cross-sections included: 118 (39 dropped)

Method	Statistic	Prob.**
Hadri Z-stat	13.9463	0.0000
Heteroscedastic Consistent Z-stat	15.3120	0.0000

\* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.  
\*\* Probabilities are computed assuming asymptotic normality

# Equation estimation – 1



Equation Estimation

Specification Panel Options Options

Equation specification

Dependent variable followed by list of regressors including ARMA and PDL terms, OR an explicit equation like  $Y=c(1)+c(2)*X$ .

sales c employ avgsal

Estimation settings

Method: LS - Least Squares (LS and AR)

Sample: 1987 1989

OK Скасувати



# Equation estimation – 2

Equation Estimation

Specification Panel Options Options

Effects specification

Cross-section: Fixed

Period: None

Weights

GLS Weights: No weights

Coef covariance method

White cross-section

☐ No d.f. correction

OK Скасувати

# Equation estimation – 3

Dependent Variable: SALES

Method: Panel Least Squares

Date: 03/31/13 Time: 13:59

Sample: 1987 1989

Periods included: 3

Cross-sections included: 119

Total panel (unbalanced) observations: 341

White cross-section standard errors & covariance (d.f. corrected)

WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3977401.	963083.6	-4.129860	0.0001
EMPLOY	134472.0	15993.56	8.407886	0.0000
AVGSAL	134.1728	20.48548	6.549651	0.0000

## Effects Specification

### Cross-section fixed (dummy variables)

R-squared	0.934488	Mean dependent var	6263453.
Adjusted R-squared	0.898754	S.D. dependent var	8203403.
S.E. of regression	2610251.	Akaike info criterion	32.65921
Sum squared resid	1.50E+15	Schwarz criterion	34.01891
Log likelihood	-5447.396	Hannan-Quinn criter.	33.20094
F-statistic	26.15140	Durbin-Watson stat	2.486688
Prob(F-statistic)	0.000000		

# Equation estimation – 4

- View → Fixed/Random effects → Cross-Section Effects

Equation: UNTITLED    Workfile: JTRAIN::Undated\									
View	Proc	Object	Print	Name	Freeze	Estimate	Forecast	Stats	F
Cross-section Fixed Effects									
	FCODE	Effect							
1	410032	29478648							
2	410440	2713365.							
3	410495	-1023835.							
4	410500	5651871.							
5	410509	2205765.							
6	410513	1033899.							
7	410518	-2738136.							
8	410521	681564.9							
9	410523	1016674.							
10	410529	-2443650.							
11	410531	-15239561							
12	410533	1608269.							
13	410535	2168307.							
14	410536	1945791.							
15	410538	-1595106.							
16	410540	-244900.7							
17	410546	-6175635.							
18	410547	488120.2							
19	410556	-8282294.							
20	410560	352442.3							
21	410562	2328564.							
22	410563	-3437068.							
23	410565	8849103.							
24	410566	1983770.							
25	410567	-361848.5							
26	410571	1228343.							
27	410577	-4267182.							
28	410586	-3890792.							

# Fixed Effects Testing

- ▶ Select View → Fixed/Random Effects Testing → Redundant Fixed Effects – Likelihood Ratio
- ▶ “Cross-section F” and “Cross-section Chi-square” evaluate the joint significance of the cross-section effects
- ▶ The two statistic values and the associated  $p$ -values strongly reject the null that the cross-section effects are redundant.

## Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.399794	(118,220)	0.0000
Cross-section Chi-square	581.650275	118	0.0000

Cross-section fixed effects test equation:

Dependent Variable: SALES

Method: Panel Least Squares

Date: 03/31/13 Time: 14:20

Sample: 1987 1989

Periods included: 3

Cross-sections included: 119

Total panel (unbalanced) observations: 341

White cross-section standard errors & covariance (d.f. corrected)

WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3298376.	453583.6	-7.271815	0.0000
EMPLOY	102503.9	7757.532	13.21347	0.0000
AVGSAL	195.3836	9.072571	21.53564	0.0000

R-squared	0.639334	Mean dependent var	6263453.
Adjusted R-squared	0.637200	S.D. dependent var	8203403.
S.E. of regression	4941144.	Akaike info criterion	33.67285
Sum squared resid	8.25E+15	Schwarz criterion	33.70656
Log likelihood	-5738.221	Hannan-Quinn criter.	33.68628
F-statistic	299.5781	Durbin-Watson stat	0.465854
Prob(F-statistic)	0.000000		

# Equation estimation – 5

Equation Estimation

Specification Panel Options Options

Equation specification

Dependent variable followed by list of regressors including ARMA and PDL terms, OR an explicit equation like  $Y=c(1)+c(2)*X$ .

sales c employ avgval

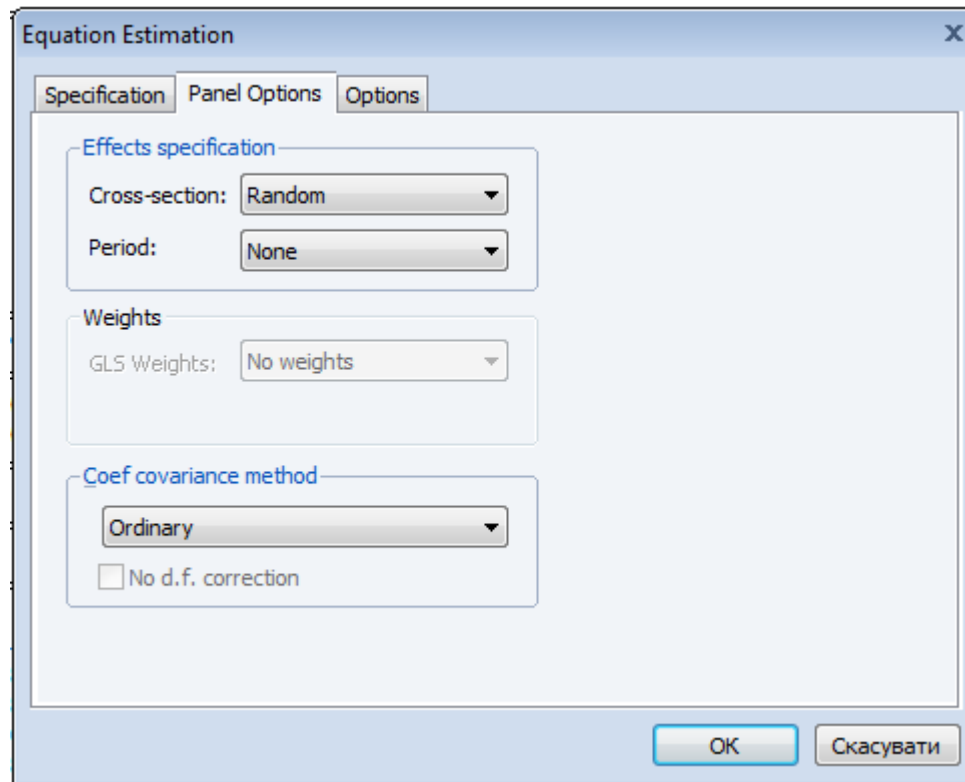
Estimation settings

Method: LS - Least Squares (LS and AR)

Sample: 1987 1989

OK Скасувати

# Equation estimation – 6



The image shows a software dialog box titled "Equation Estimation". It has three tabs: "Specification", "Panel Options", and "Options". The "Specification" tab is active. Inside, there are three sections: "Effects specification" with "Cross-section" set to "Random" and "Period" set to "None"; "Weights" with "GLS Weights" set to "No weights"; and "Coef covariance method" with "Ordinary" selected and an unchecked checkbox for "No d.f. correction". At the bottom right are "OK" and "Скасувати" (Cancel) buttons.

Equation Estimation

Specification Panel Options Options

Effects specification

Cross-section: Random

Period: None

Weights

GLS Weights: No weights

Coef covariance method

Ordinary

☐ No d.f. correction

OK Скасувати

# Equation estimation – 6

Dependent Variable: SALES  
 Method: Panel EGLS (Cross-section random effects)  
 Date: 03/31/13 Time: 14:01  
 Sample: 1987 1989  
 Periods included: 3  
 Cross-sections included: 119  
 Total panel (unbalanced) observations: 341  
 Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3826804.	1100534.	-3.477224	0.0006
EMPLOY	111807.4	5524.442	20.23869	0.0000
AVGSAL	194.4691	52.31016	3.717617	0.0002

Effects Specification		S.D.	Rho
Cross-section random		4209040.	0.7222
Idiosyncratic random		2610251.	0.2778

Weighted Statistics			
R-squared	0.557628	Mean dependent var	2137245.
Adjusted R-squared	0.555011	S.D. dependent var	3935042.
S.E. of regression	2626183.	Sum squared resid	2.33E+15
F-statistic	213.0315	Durbin-Watson stat	1.620309
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.634243	Mean dependent var	6263453.
Sum squared resid	8.37E+15	Durbin-Watson stat	0.451341

# Hausman test – 1

- ▶ The statistic provides much evidence against the null hypothesis that there is misspecification.

Correlated Random Effects - Hausman Test  
Equation: Untitled  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.159824	2	0.0169

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
EMPLOY	134471.9...	111807.44...	63081118....	0.0043
AVGSAL	134.172752	194.469129	7153.359218	0.4759

Cross-section random effects test equation:

Dependent Variable: SALES  
Method: Panel Least Squares  
Date: 03/31/13 Time: 14:02  
Sample: 1987 1989  
Periods included: 3  
Cross-sections included: 119  
Total panel (unbalanced) observations: 341

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3977401.	1840961.	-2.160502	0.0318
EMPLOY	134472.0	9674.739	13.89929	0.0000
AVGSAL	134.1728	99.44703	1.349188	0.1787

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.934488	Mean dependent var	6263453.
Adjusted R-squared	0.898754	S.D. dependent var	8203403.
S.E. of regression	2610251.	Akaike info criterion	32.65921
Sum squared resid	1.50E+15	Schwarz criterion	34.01891
Log likelihood	-5447.396	Hannan-Quinn criter.	33.20094
F-statistic	26.15140	Durbin-Watson stat	2.486688
Prob(F-statistic)	0.000000		



# Hausman test – 2

- ▶ The next portion of output provides additional test detail, showing the coefficient estimates from both the random and fixed effects estimators, along with the variance of the difference and associated  $p$ -values for the hypothesis that there is no difference.
- ▶ Note that in some cases, the estimated variances can be negative so that the probabilities cannot be computed.

Correlated Random Effects - Hausman Test  
Equation: Untitled  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.159824	2	0.0169

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
EMPLOY	134471.9...	111807.44...	63081118....	0.0043
AVGSAL	134.172752	194.469129	7153.359218	0.4759

Cross-section random effects test equation:

Dependent Variable: SALES  
Method: Panel Least Squares  
Date: 03/31/13 Time: 14:02  
Sample: 1987 1989  
Periods included: 3  
Cross-sections included: 119  
Total panel (unbalanced) observations: 341

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3977401.	1840961.	-2.160502	0.0318
EMPLOY	134472.0	9674.739	13.89929	0.0000
AVGSAL	134.1728	99.44703	1.349188	0.1787

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.934488	Mean dependent var	6263453.
Adjusted R-squared	0.898754	S.D. dependent var	8203403.
S.E. of regression	2610251.	Akaike info criterion	32.65921
Sum squared resid	1.50E+15	Schwarz criterion	34.01891
Log likelihood	-5447.396	Hannan-Quinn criter.	33.20094
F-statistic	26.15140	Durbin-Watson stat	2.486688
Prob(F-statistic)	0.000000		

# Hausman test – 3

- ▶ The bottom portion of the output contains the results from the corresponding fixed effects estimation

Correlated Random Effects - Hausman Test  
Equation: Untitled  
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.159824	2	0.0169

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
EMPLOY	134471.9...	111807.44...	63081118....	0.0043
AVGSAL	134.172752	194.469129	7153.359218	0.4759

Cross-section random effects test equation:

Dependent Variable: SALES  
Method: Panel Least Squares  
Date: 03/31/13 Time: 14:02  
Sample: 1987 1989  
Periods included: 3  
Cross-sections included: 119  
Total panel (unbalanced) observations: 341

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3977401.	1840961.	-2.160502	0.0318
EMPLOY	134472.0	9674.739	13.89929	0.0000
AVGSAL	134.1728	99.44703	1.349188	0.1787

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.934488	Mean dependent var	6263453.
Adjusted R-squared	0.898754	S.D. dependent var	8203403.
S.E. of regression	2610251.	Akaike info criterion	32.65921
Sum squared resid	1.50E+15	Schwarz criterion	34.01891
Log likelihood	-5447.396	Hannan-Quinn criter.	33.20094
F-statistic	26.15140	Durbin-Watson stat	2.486688
Prob(F-statistic)	0.000000		

# Omitted Variables Test

- ▶ Select **View→Coefficient Diagnostics → Omitted Variables–Likelihood Ratio...** and in the resulting dialog, enter the names of the variables you wish to add to the default specification.

Omitted Variables Test  
Equation: UNTITLED  
Specification: SALES C EMPLOY AVGSAL  
Omitted Variables: D89

	Value	df	Probability
t-statistic	0.705050	337	0.4813
F-statistic	0.497096	(1, 337)	0.4813

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	3.43E+12	1	3.43E+12
Restricted SSR	2.33E+15	338	6.90E+12
Unrestricted SSR	2.33E+15	337	6.91E+12
Unrestricted SSR	2.33E+15	337	6.91E+12

D89 is a significant variable

# Redundant Variables Test

- ▶ Select **View** → **Coefficient Diagnostics** → **Redundant Variables – Likelihood Ratio...** and in the resulting dialog, enter the names of the variables in the current specification that you wish to remove in the restricted model.
- ▶ It works **only** when you don't have missed data.

# Questions?



# Self study