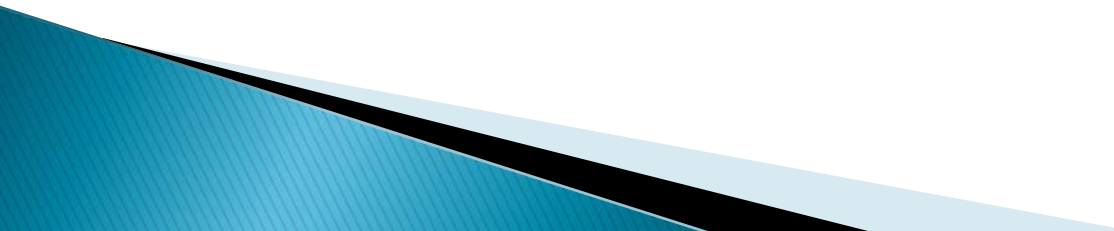


# ARIMA y EViews

Доц. Андрій Ставицький

# Файл: macromod.wf1

- ▶ CN – рівень приватного споживання
  - ▶ G – рівень державного споживання
  - ▶ I – рівень інвестицій
  - ▶ M1 – грошова маса M1
  - ▶ NX – чистий експорт
  - ▶ P – Індекс рівня цін
  - ▶ R – Ставка відсотку
  - ▶ Y – ВВП
- 

# Виділення тренду: лінійний тренд – 1

$$f(t) = a_0 + a_1 t$$

Equation Estimation

Specification Options

Equation specification

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

y c @trend

Estimation settings

Method: LS - Least Squares (NLS and ARMA)

Sample: 1947q1 2005q4

OK Скасувати

# Виділення тренду: лінійний тренд – 2

Equation: UNTITLED    Workfile: MACROMOD::Macromod\

View

Proc

Object

Print

Name

Freeze

Estimate

Forecast

Stats

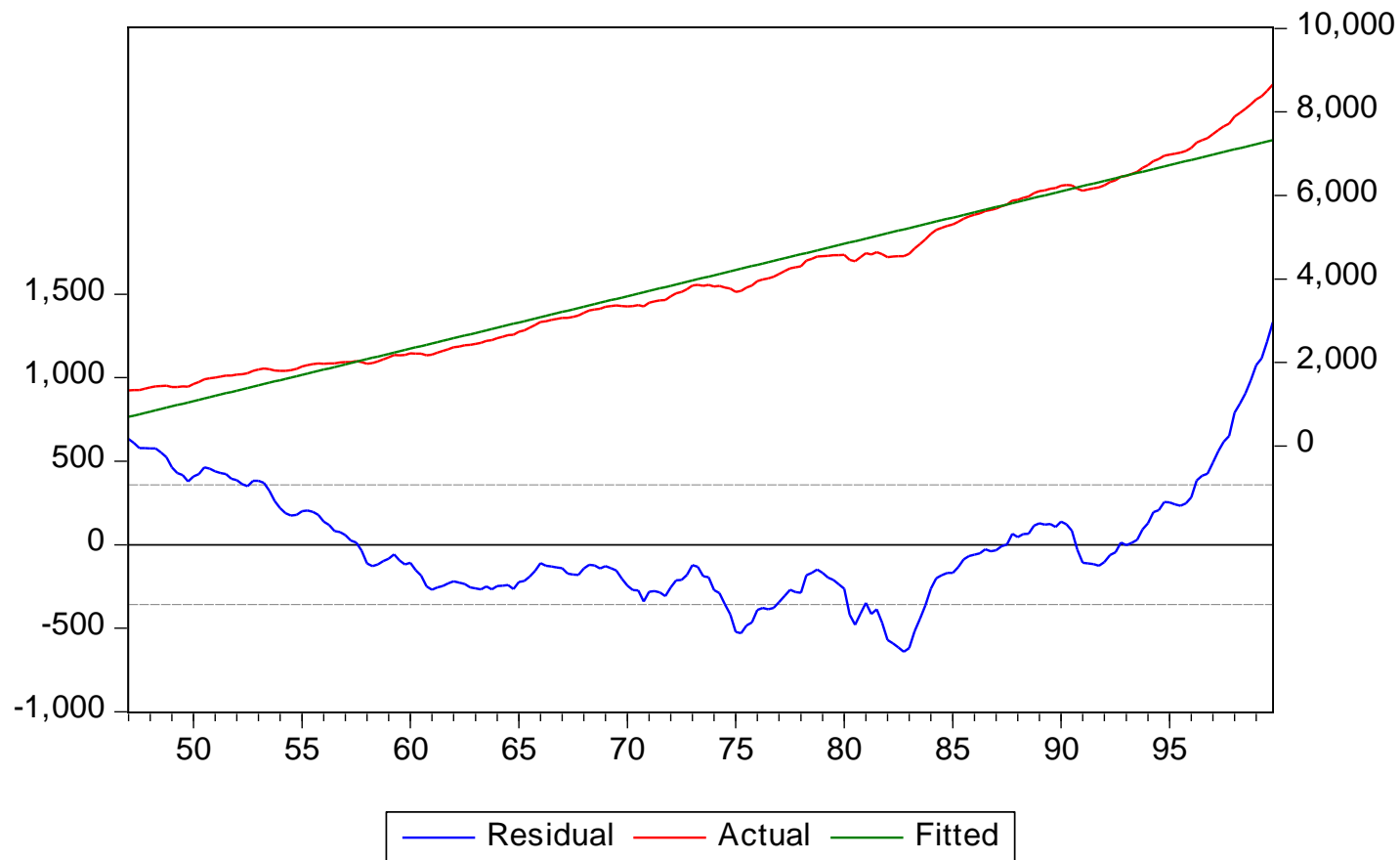
Resids

Dependent Variable: Y  
Method: Least Squares  
Date: 06/03/15    Time: 13:30  
Sample (adjusted): 1947Q1 1999Q4  
Included observations: 212 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	698.4891	49.05925	14.23766	0.0000
@TREND	31.39246	0.402240	78.04412	0.0000

R-squared	0.966671	Mean dependent var	4010.393
Adjusted R-squared	0.966513	S.D. dependent var	1958.633
S.E. of regression	358.4210	Akaike info criterion	14.61068
Sum squared resid	26977783	Schwarz criterion	14.64235
Log likelihood	-1546.732	Hannan-Quinn criter.	14.62348
F-statistic	6090.884	Durbin-Watson stat	0.014227
Prob(F-statistic)	0.000000		

# Виділення тренду: лінійний тренд – 3



# Виділення тренду: Квадратичний тренд

$$f(t) = a_0 + a_1t + a_2t^2$$

Equation Estimation

Specification Options

Equation specification

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

y c @trend @trend^2

Estimation settings

Method: LS - Least Squares (NLS and ARMA)

Sample: 1947q1 2005q4

OK Скасувати

# Виділення тренду: Експоненціальний тренд

$$f(t) = a_0 e^{a_1 t}$$

Equation Estimation

Specification Options

Equation specification

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

`log(y) c @trend`

Estimation settings

Method: LS - Least Squares (NLS and ARMA)

Sample: 1947q1 2005q4

OK Скасувати

# Виділення тренду: Гіперболічний тренд

$$f(t) = \frac{a_0}{1 + a_1 t}$$

Equation Estimation

Specification Options

Equation specification

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

$y=c(1)/(1+c(2)*@trend)$

Estimation settings

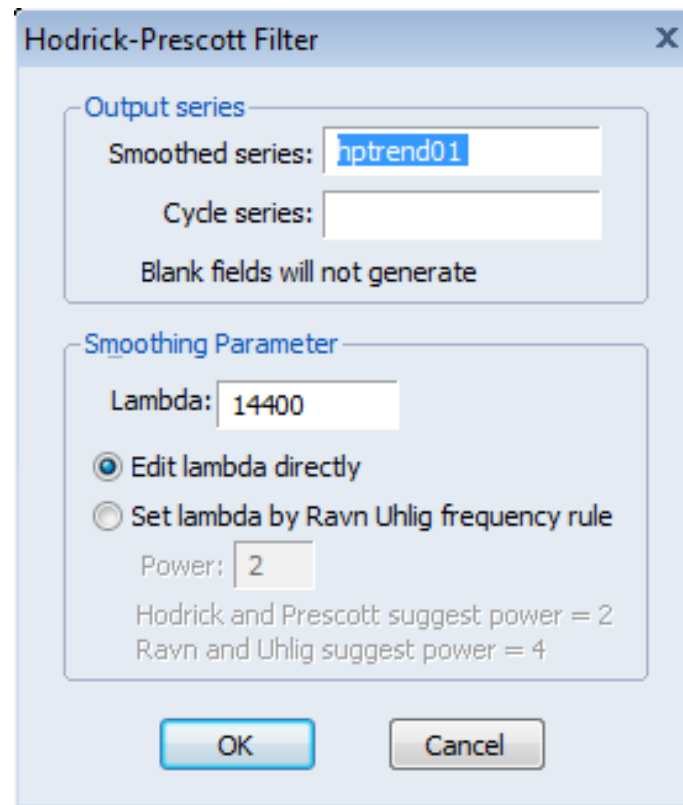
Method: LS - Least Squares (NLS and ARMA)

Sample: 1947q1 2005q4

OK Скасувати



# Procs–Hodrick Prescott Filter – 1



The image shows a dialog box titled "Hodrick-Prescott Filter" with a close button (X) in the top right corner. The dialog is divided into two main sections: "Output series" and "Smoothing Parameter".

**Output series**

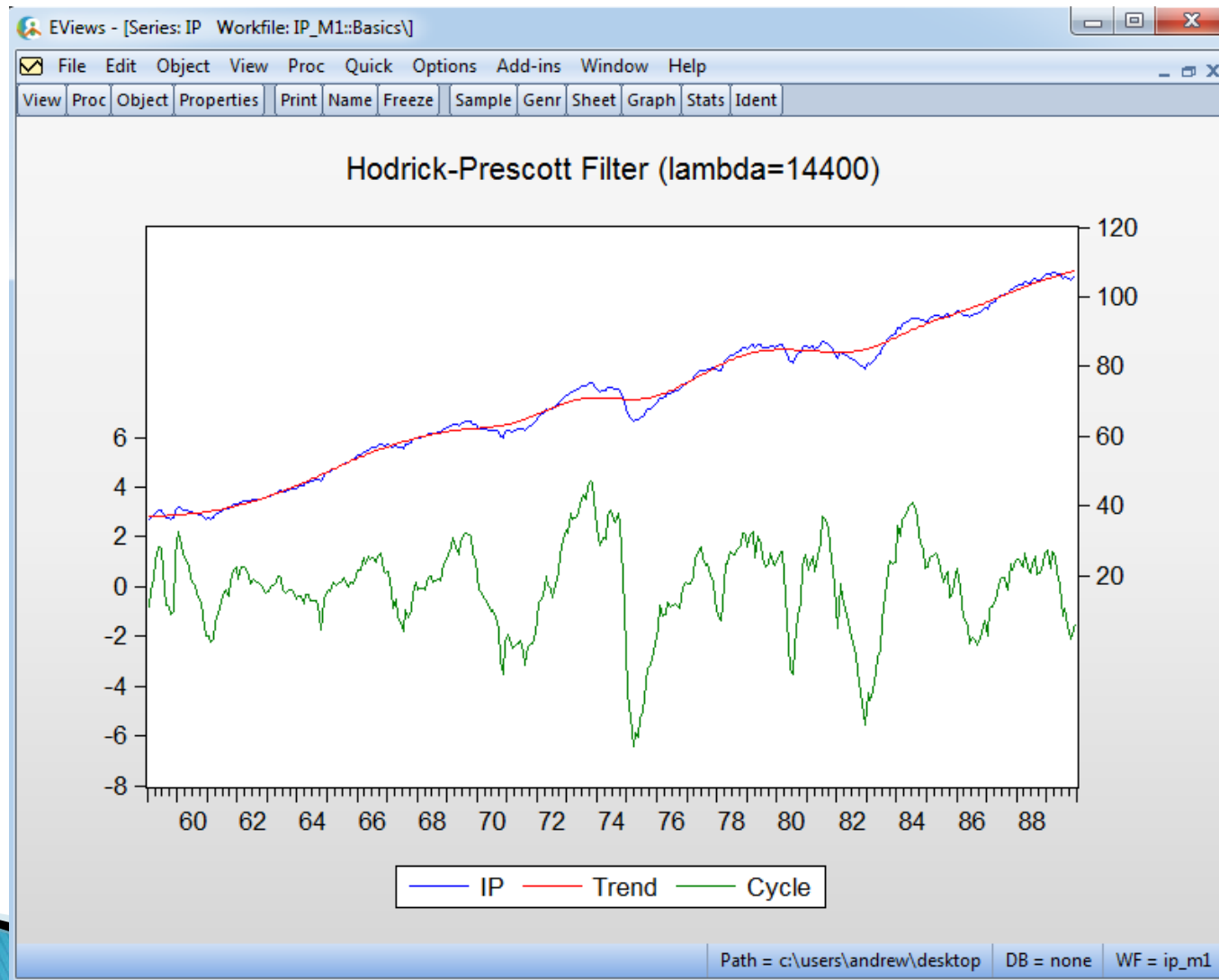
- Smoothed series:
- Cycle series:
- Blank fields will not generate

**Smoothing Parameter**

- Lambda:
- ☒ Edit lambda directly
- ☐ Set lambda by Ravn Uhlig frequency rule
  - Power:
  - Hodrick and Prescott suggest power = 2
  - Ravn and Uhlig suggest power = 4

At the bottom of the dialog are two buttons: "OK" and "Cancel".

# Procs–Hodrick Prescott Filter – 2

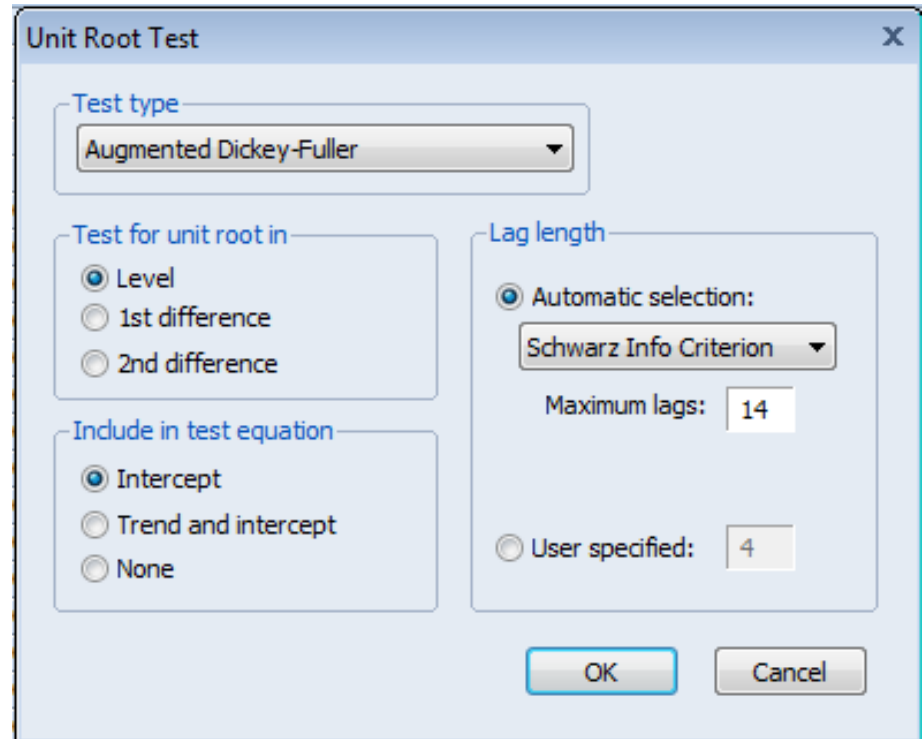


# ARIMA: Етапи

- ▶ Визначення порядку інтегрованості
- ▶ Оцінка моделі
- ▶ Діагностика моделі

# Визначення порядку інтегрованості – 1

Variable-View-Unit Root Test...



The image shows a 'Unit Root Test' dialog box with the following settings:

- Test type:** Augmented Dickey-Fuller
- Test for unit root in:**
  - ☒ Level
  - ☐ 1st difference
  - ☐ 2nd difference
- Include in test equation:**
  - ☒ Intercept
  - ☐ Trend and intercept
  - ☐ None
- Lag length:**
  - ☒ Automatic selection:
    - Schwarz Info Criterion
    - Maximum lags: 14
  - ☐ User specified: 4

Buttons: OK, Cancel

# Визначення порядку інтегрованості – 2

Series: Y Workfile: MACROMOD::Macromod\				
View	Proc	Object	Properties	Print Name Freeze Sample Genr Sheet Graph Stats I
Augmented Dickey-Fuller Unit Root Test on Y				
Null Hypothesis: Y has a unit root				
Exogenous: Constant				
Lag Length: 1 (Automatic - based on SIC, maxlag=14)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			3.707786	1.0000
Test critical values:	1% level		-3.461478	
	5% level		-2.875128	
	10% level		-2.574090	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(Y)				
Method: Least Squares				
Date: 06/03/15 Time: 14:42				
Sample (adjusted): 1947Q3 1999Q4				
Included observations: 210 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y(-1)	0.005178	0.001396	3.707786	0.0003
D(Y(-1))	0.424602	0.064279	6.605596	0.0000
C	-0.386552	5.667511	-0.068205	0.9457
R-squared	0.309025	Mean dependent var		34.83703
Adjusted R-squared	0.302349	S.D. dependent var		42.68304
S.E. of regression	35.65121	Akaike info criterion		9.999626
Sum squared resid	263098.9	Schwarz criterion		10.04744
Log likelihood	-1046.961	Hannan-Quinn criter.		10.01896
F-statistic	46.28843	Durbin-Watson stat		2.054223
Prob(F-statistic)	0.000000			

# Оцінка моделі

Equation Estimation

Specification Options

Equation specification

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

$d(y) \ c \ ar(1) \ ar(2) \ ma(1)$

Estimation settings

Method: LS - Least Squares (NLS and ARMA)

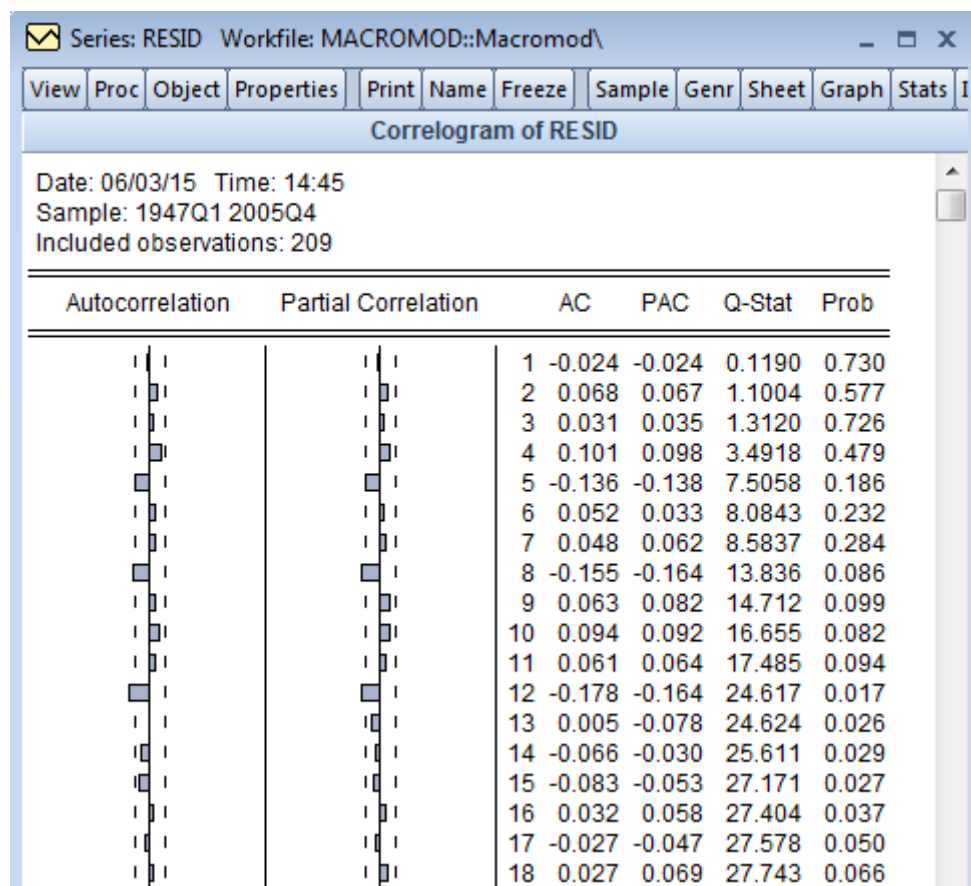
Sample: 1947q1 2005q4

OK Скасувати

# Діагностика моделі – 1

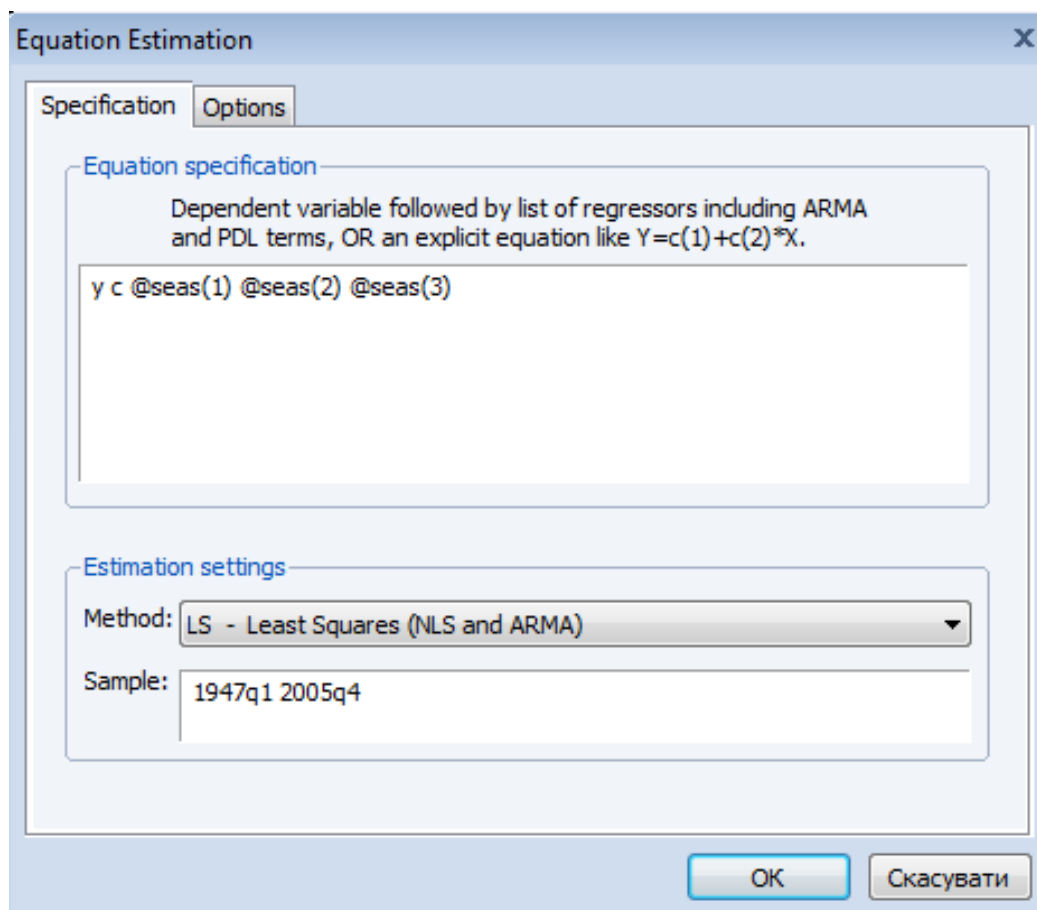
Equation: UNTITLED Workfile: MACROMOD::Macromod\					
View	Proc	Object	Print	Name	Freeze
Estimate	Forecast	Stats	Resids		
Dependent Variable: D(Y)					
Method: Least Squares					
Date: 06/03/15 Time: 14:44					
Sample (adjusted): 1947Q4 1999Q4					
Included observations: 209 after adjustments					
Convergence achieved after 40 iterations					
MA Backcast: 1947Q3					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	251.0847	2460.600	0.102042	0.9188	
AR(1)	1.424203	0.065502	21.74274	0.0000	
AR(2)	-0.424939	0.066884	-6.353342	0.0000	
MA(1)	-0.985655	0.010958	-89.94951	0.0000	
R-squared	0.294622	Mean dependent var		34.99814	
Adjusted R-squared	0.284300	S.D. dependent var		42.72147	
S.E. of regression	36.14196	Akaike info criterion		10.03174	
Sum squared resid	267779.5	Schwarz criterion		10.09571	
Log likelihood	-1044.317	Hannan-Quinn criter.		10.05760	
F-statistic	28.54149	Durbin-Watson stat		2.032325	
Prob(F-statistic)	0.000000				
Inverted AR Roots	1.00	.43			
Inverted MA Roots	.99				

# Діагностика моделі – 2





# Виділення сезонних коливань – 1



Equation Estimation

Specification Options

Equation specification

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

y c @seas(1) @seas(2) @seas(3)

Estimation settings

Method: LS - Least Squares (NLS and ARMA)

Sample: 1947q1 2005q4

OK Скасувати

# Виділення сезонних коливань – 2

Equation: UNTITLED    Workfile: MACROMOD::Macromod\				
View	Proc	Object	Print	Name
Freeze	Estimate	Forecast	Stats	Resids
Dependent Variable: Y				
Method: Least Squares				
Date: 06/03/15    Time: 14:47				
Sample (adjusted): 1947Q1 1999Q4				
Included observations: 212 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4059.243	270.9226	14.98303	0.0000
@SEAS(1)	-100.1399	383.1424	-0.261365	0.7941
@SEAS(2)	-64.37526	383.1424	-0.168019	0.8667
@SEAS(3)	-30.88335	383.1424	-0.080605	0.9358
R-squared	0.000365	Mean dependent var	4010.393	
Adjusted R-squared	-0.014052	S.D. dependent var	1958.633	
S.E. of regression	1972.346	Akaike info criterion	18.03052	
Sum squared resid	8.09E+08	Schwarz criterion	18.09385	
Log likelihood	-1907.235	Hannan-Quinn criter.	18.05612	
F-statistic	0.025345	Durbin-Watson stat	0.001709	
Prob(F-statistic)	0.994532			

Питання?



# Самостійна робота