

# Разбор задачи 3.33 (Катышев, Магнус - Сборник задач по начальному курсу эконометрики)

Подготовила презентацию Поповская Наталья,  
НБ-401

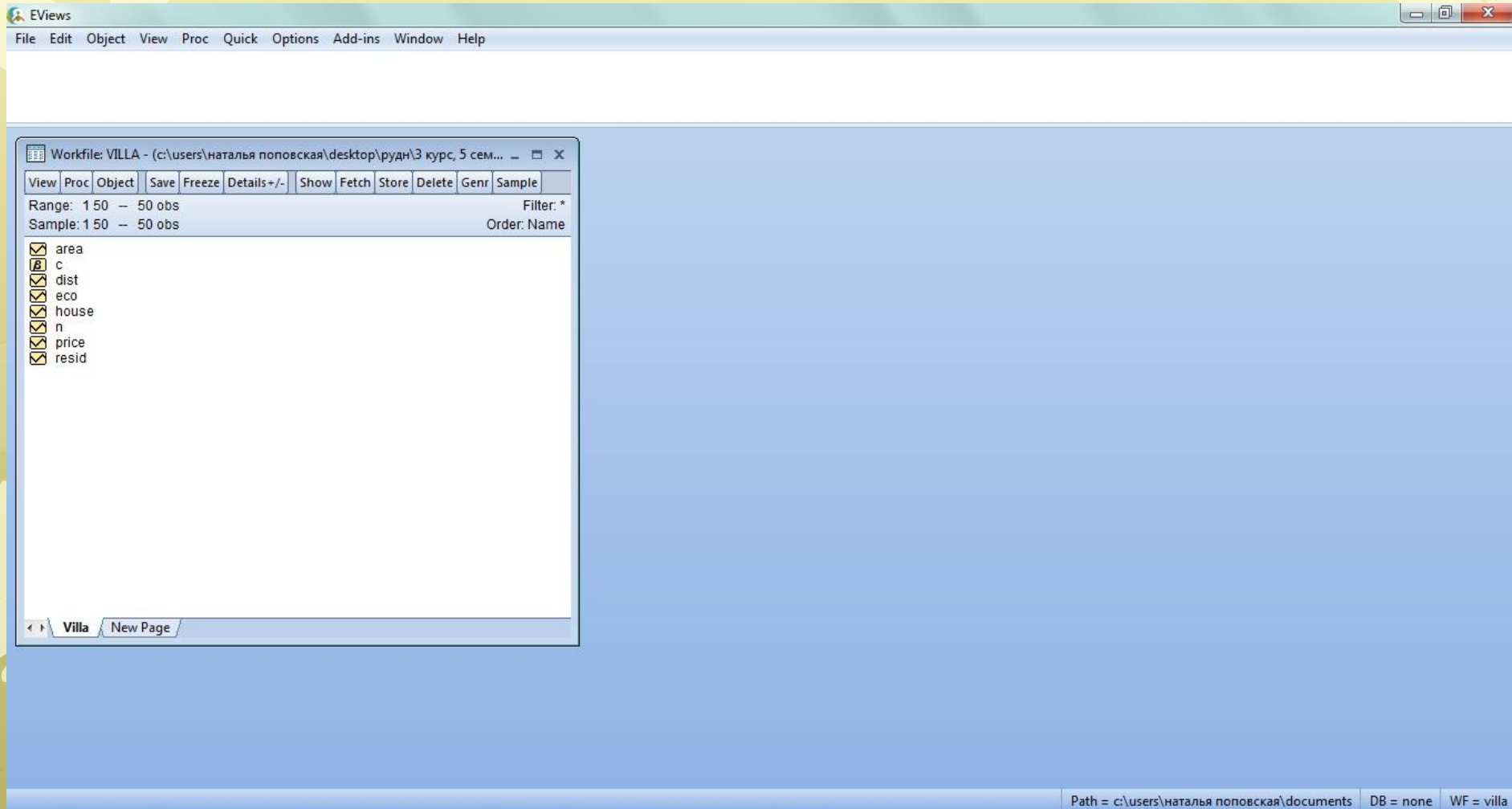
# Формулировка задачи 3.33

- Рассматривается информация о стоимости коттеджей в Московской области по Киевскому направлению (по данным строительной компании «Стройсервис», осень 1997 г.)
- Данные находятся в файле villa.xls. Переменные описаны в таблице 3.28.
- Подберите функциональную форму зависимости цены коттеджа от его параметров, учитывая такие факторы, как t-статистика и коэффициент детерминации  $R^2$

Таблица 3.28

Переменная	Описание
n	номер по порядку
price	цена в тыс. долл.
dist	расстояние от кольцевой автодороги в км
house	площадь дома в кв. м
area	площадь участка в сотках

# Открытие файла villa.wf1 в Eviews



# Построение описательной статистики [1]

The screenshot displays the EViews software interface. The main window title is "Workfile: VILLA - (c:\users\наталья поповская\desktop\рудн\3 курс, 5 сем...". The menu bar includes "File", "Edit", "Object", "View", "Proc", "Quick", "Options", "Add-ins", "Window", and "Help".

In the left-hand pane, a list of objects is shown with checkboxes: area, c, dist, eco, house, n, price, and resid. The "resid" object is selected, and a context menu is open over it. The menu options are:

- Open
- Copy (Ctrl+C)
- Copy Special...
- Paste (Ctrl+V)
- Paste Special...
- Manage Links & Formulae...
- Fetch from DB...
- Update from DB...
- Store to DB...
- Export to file...
- Rename...
- Delete

The "Open" submenu is expanded, showing the following options:

- as Group
- as Equation...
- as Factor...
- as VAR...
- as System...
- as Multiple series

The status bar at the bottom of the window shows: "Path = c:\users\наталья поповская\documents DB = none WF = villa".

# Построение описательной статистики [2]

The screenshot displays the EViews software interface. The main window shows a data table for a group named 'UNTITLED' in the 'Villa' workspace. The table contains 23 observations with four variables: PRICE, HOUSE, DIST, and AREA. The status bar at the bottom indicates the file path, database name, and workspace name.

Workfile: VILLA - (c:\users\наталья поповская\desktop\рудн\3 курс, 5 сем... - X

View Proc Object Save Freeze Details+/- Show Fetch Store Delete Genr Sample

Range: 1 50 -- 50 obs Filter: \*

Sample: 1 50 -- 50 obs Order: Name

area  
c  
dist  
eco  
house  
n  
price  
resid

Group: UNTITLED Workfile: VILLA:Villa\

	PRICE	HOUSE	DIST	AREA
1	300.0	400	20.0	22.0
2	60.0	170	18.0	6.0
3	14.0	60	90.0	11.0
4	38.0	65	18.0	6.0
5	85.0	320	25.0	20.0
6	85.0	210	19.0	20.0
7	28.0	60	30.0	5.0
8	83.0	228	45.0	20.0
9	80.0	200	25.0	20.0
10	15.0	36	46.0	10.0
11	27.0	180	86.0	17.0
12	42.0	250	85.0	15.0
13	5.5	36	85.0	12.0
14	47.0	285	74.0	15.0
15	5.0	36	95.0	10.0
16	59.0	420	9.0	10.0
17	27.0	130	12.0	6.0
18	270.0	350	15.0	15.0
19	96.0	300	39.0	15.0
20	95.0	200	25.0	14.0
21	6.0	36	65.0	6.0
22	120.0	300	28.0	32.0
23	100.0	170	20.0	15.0

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Построение описательной статистики [3]

The screenshot shows the EViews software interface. The main window displays a workfile named 'VILLA' with a range of 1 to 50 observations. A list of variables is shown on the left, including 'area', 'c', 'dist', 'eco', 'house', 'n', 'price', and 'resid'. A context menu is open over the 'Group: UNTITLED' window, showing various statistical analysis options. The 'Descriptive Stats' option is selected, and a sub-menu is visible with 'Common Sample' and 'Individual Samples' options. The 'Common Sample' option is currently selected.

Group Members	USE	DIST	AREA
JSE	JSE	DIST	AREA
Spreadsheet	400	20.0	22.0
Dated Data Table	170	18.0	6.0
Graph...	60	90.0	11.0
	65	18.0	6.0
Descriptive Stats			20.0
			20.0
			5.0
Covariance Analysis...			
N-Way Tabulation...	228	45.0	20.0
Tests of Equality...	200	25.0	20.0
	36	46.0	10.0
Principal Components...	180	86.0	17.0
	250	85.0	15.0
Correlogram (1) ...	36	85.0	12.0
Cross Correlation (2) ...	285	74.0	15.0
	36	95.0	10.0
Long-run Covariance...	420	9.0	10.0
Unit Root Test...	130	12.0	6.0
Cointegration Test	350	15.0	15.0
	300	39.0	15.0
Granger Causality...	200	25.0	14.0
	36	65.0	6.0
Label	300	28.0	32.0

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Построение описательной статистики [4]

Workfile: VILLA - (c:\users\наталья поповская\desktop\рудн\3 курс, 5 сем...)

View Proc Object Save Freeze Details +/- Show Fetch Store Delete Genr Sample

Range: 1 50 -- 50 obs Filter: \*  
Sample: 1 50 -- 50 obs Order: Name

- area
- c
- dist
- eco
- house
- n
- price
- resid

Group: UNTITLED Workfile: VILLA::Villa\

View	Proc	Object	Print	Name	Freeze	Sample	Sheet	Stats	Spec
			PRICE	HOUSE				DIST	AREA
Mean			78.25000	192.2400				44.05000	13.75000
Median			46.00000	160.0000				30.00000	14.00000
Maximum			320.0000	600.0000				105.0000	40.00000
Minimum			5.000000	22.00000				0.500000	5.000000
Std. Dev.			84.34322	151.8475				28.80481	6.913644
Skewness			1.605151	0.840332				0.704814	1.441808
Kurtosis			4.790587	2.752538				2.220736	6.047740
Jarque-Bera			28.15050	6.012229				5.404804	36.67492
Probability			0.000001	0.049484				0.067044	0.000000
Sum			3912.500	9612.000				2202.500	687.5000
Sum Sq. Dev.			348575.1	1129825.				40656.12	2342.125
Observations			50	50				50	50

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Сохранение через Freeze->Name [1]

The screenshot shows the EViews software interface. The main window displays a data table with the following content:

	PRICE	HOUSE	DIST	AREA
Mean	78.25000	192.2400	44.05000	13.75000
Median	46.00000	160.0000	30.00000	14.00000
Maximum	320.0000	600.0000	105.0000	40.00000
Minimum	5.000000	22.00000	0.500000	5.000000
Std. Dev.	84.34322	151.8475	28.80481	6.913644
Skewness	1.605151	0.840332	0.704814	1.441808
Kurtosis	4.790587	2.752538	2.220736	6.047740
Jarque-Bera	28.15050	6.012229	5.404804	36.67492
Probability	0.000001	0.049484	0.067044	0.000000
Sum	3912.500	9612.000	2202.500	687.5000
Sum Sq. Dev.	348575.1	1129825.	40656.12	2342.125
Observations	50	50	50	50

The interface also shows a menu bar with options like File, Edit, Object, View, Proc, Quick, Options, Add-ins, Window, and Help. A toolbar includes buttons for View, Proc, Object, Save, Freeze, Details+/-, Show, Fetch, Store, Delete, Genr, and Sample. The status bar at the bottom indicates the path as c:\users\наталья поповская\documents, DB = none, and WF = villa.



# Сохранение через Freeze->Name [2]

The screenshot shows the EViews software interface. A window titled 'Table: UNTITLED' is open, displaying statistical results for a sample of 50 observations. The table has columns for variables: PRICE, HOUSE, DIST, and AREA. The rows show various statistical measures.

	PRICE	HOUSE	DIST	AREA
Mean	78.25000	192.2400	44.05000	13.75000
Median	46.00000	160.0000	30.00000	14.00000
Maximum	320.0000	600.0000	105.0000	40.00000
Minimum	5.000000	22.00000	0.500000	5.000000
Std. Dev.	84.34322	151.8475	28.80481	6.913644
Skewness	1.605151	0.840332	0.704814	1.441808
Kurtosis	4.790587	2.752538	2.220736	6.047740
Jarque-Bera	28.15050	6.012229	5.404804	36.67492
Probability	0.000001	0.049484	0.067044	0.000000
Sum	3912.500	9612.000	2202.500	687.5000
Sum Sq. Dev.	348575.1	1129825.	40656.12	2342.125
Observations	50	50	50	50

The bottom status bar of the EViews window shows: Path = c:\users\наталья поповская\documents DB = none WF = villa

# Сохранение через Freeze->Name [3]

The screenshot shows the EViews software interface. A table titled 'Table: UNTITLED Workfile: VILLA::Villa\' is displayed with columns A through E. The table contains statistical data for the variable 'AREA'. An 'Object Name' dialog box is open, allowing the user to name the object. The dialog has a text field containing 'descr\_stat' and a checkbox for 'Display name for labeling tables and graphs (optional)'. The 'OK' button is highlighted.

	A	B	C	D	E
1	Date: 11/01/15	Time: 01:05			
2	Sample: 1 50				
3					
4					
5					
6	Mean				13.75000
7	Median				14.00000
8	Maximum				40.00000
9	Minimum				5.000000
10	Std. Dev				5.913644
11	Skewness				1.441808
12	Kurtosis				5.047740
13	Jarque-Bera				36.67492
14	Probab				0.000000
15					
16					
17	Sum				687.5000
18	Sum Sq. Dev.	348575.1	1129825.	40656.12	2342.125
19					
20	Observations	50	50	50	50
21					
22					
23					
24					

# Сохранение через Freeze->Name [4]

The screenshot displays the EViews software interface. The main window title is "EViews". The menu bar includes "File", "Edit", "Object", "View", "Proc", "Quick", "Options", "Add-ins", "Window", and "Help". A secondary menu bar within the main window includes "View", "Proc", "Object", "Save", "Freeze", "Details+/-", "Show", "Fetch", "Store", "Delete", "Genr", and "Sample".

The "Freeze" menu is open, showing the following options:

- Range: 1 50 -- 50 obs
- Sample: 1 50 -- 50 obs
- Filter: \*
- Order: Name

A list of variables is displayed below the menu options, each with a checked checkbox:

- area
- c
- descr\_stat
- dist
- eco
- house
- n
- price
- resid

The status bar at the bottom of the window shows "Path = c:\users\наталья поповская\documents", "DB = none", and "WF = villa".

# Построение корреляционной матрицы [1]

The screenshot displays the EViews software interface. The main window title is "EViews". The menu bar includes "File", "Edit", "Object", "View", "Proc", "Quick", "Options", "Add-ins", "Window", and "Help". The workfile is named "VILLA - (c:\users\наталья поповская\desktop\рудн\3 курс, 5 сем...". The toolbar contains buttons for "View", "Proc", "Object", "Save", "Freeze", "Details+/-", "Show", "Fetch", "Store", "Delete", "Gener", and "Sample". The main area shows a list of variables: "area", "c", "descr\_stat", "dist", "eco", "house", "n", "price", and "resid". A context menu is open over the "n" variable, showing options like "Open", "Copy", "Paste", "Manage Links & Formulae...", "Fetch from DB...", "Update from DB...", "Store to DB...", "Export to file...", "Rename...", and "Delete". A sub-menu is also visible, listing options: "as Group", "as Equation...", "as Factor...", "as VAR...", "as System...", and "as Multiple series". The status bar at the bottom indicates "Path = c:\users\наталья поповская\documents", "DB = none", and "WF = villa".

# Построение корреляционной матрицы [2]

The screenshot displays the EViews software interface. The main window shows a data table with the following columns: PRICE, HOUSE, DIST, and AREA. The rows represent individual observations, numbered 1 through 23. The status bar at the bottom indicates the file path, database name, and workfile name.

	PRICE	HOUSE	DIST	AREA
1	300.0	400	20.0	22.0
2	60.0	170	18.0	6.0
3	14.0	60	90.0	11.0
4	38.0	65	18.0	6.0
5	85.0	320	25.0	20.0
6	85.0	210	19.0	20.0
7	28.0	60	30.0	5.0
8	83.0	228	45.0	20.0
9	80.0	200	25.0	20.0
10	15.0	36	46.0	10.0
11	27.0	180	86.0	17.0
12	42.0	250	85.0	15.0
13	5.5	36	85.0	12.0
14	47.0	285	74.0	15.0
15	5.0	36	95.0	10.0
16	59.0	420	9.0	10.0
17	27.0	130	12.0	6.0
18	270.0	350	15.0	15.0
19	96.0	300	39.0	15.0
20	95.0	200	25.0	14.0
21	6.0	36	65.0	6.0
22	120.0	300	28.0	32.0
23	125.0	170	22.0	15.0

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Построение корреляционной матрицы [3]

The screenshot shows the EViews software interface. The main window displays a data table with three columns: USE, DIST, and AREA. The 'Covariance Analysis...' menu option is highlighted in the 'Group: UNTITLED' window. The status bar at the bottom indicates the file path, database name, and workfile name.

Workfile: VILLA - (c:\users\наталья поповская\desktop\рудн\4 курс, 7 сем... - X

View Proc Object Save Freeze Details+/- Show Fetch Store Delete Genr Sample

Range: 1 50 -- 50 obs Filter: \*  
Sample: 1 50 -- 50 obs Order: Name

Group: UNTITLED Workfile: VILLA::Villa\

View Proc Object Print Name Freeze Default Sort Edit+/- Smp1+/- Compare+/-

	USE	DIST	AREA
Group Members	USE	DIST	AREA
Spreadsheet	400	20.0	22.0
Dated Data Table	170	18.0	6.0
Graph...	60	90.0	11.0
	65	18.0	6.0
Descriptive Stats	320	25.0	20.0
	210	19.0	20.0
Covariance Analysis...	60	30.0	5.0
N-Way Tabulation...	228	45.0	20.0
Tests of Equality...	200	25.0	20.0
Principal Components...	36	46.0	10.0
	180	86.0	17.0
Correlogram (1) ...	250	85.0	15.0
Cross Correlation (2) ...	36	85.0	12.0
Long-run Covariance...	285	74.0	15.0
Unit Root Test...	36	95.0	10.0
Cointegration Test	420	9.0	10.0
Granger Causality...	130	12.0	6.0
	350	15.0	15.0
	300	39.0	15.0
	200	25.0	14.0
	36	65.0	6.0
	300	28.0	32.0

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Построение корреляционной матрицы [4]

Workfile: VILLA - (c:\users\наталья поповская\desktop\рудн\4 курс, 7 сем... - X

View Proc Object Save Freeze Details+/- Show Fetch Store Delete Genr Sample

Range: 1 50 -- 50 obs Filter: \*  
Sample: 1 50 -- 50 obs Order: Name

area  
c  
descr\_st  
dist  
eco  
house  
n  
price  
resid

**Covariance Analysis**

Statistics

Method: Ordinary

Covariance  Number of cases  
 Correlation  Number of obs.  
 SSCP  Sum of weights  
 t-statistic  
 Probability |t| = 0

Layout: Single table

Sample

1 50

Balanced sample (listwise deletion)

Partial analysis

Series or groups for conditioning (optional):

Options

Weighting: None

Weight series:

d.f. corrected covariances

Multiple comparison adjustments: None

Saved results basename:

OK Cancel

20	95.0	200	25.0	14.0
21	6.0	36	65.0	6.0
22	120.0	300	28.0	32.0
23				

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Построение корреляционной матрицы [5]

The screenshot displays the EViews software interface. The main window shows a 'Covariance Analysis: Ordinary' window with the following details:

- Group: UNTITLED
- Workfile: VILLA::Villa\
- Date: 11/01/15 Time: 20:22
- Sample: 1 50
- Included observations: 50

The window displays a correlation matrix for the variables PRICE, HOUSE, DIST, and AREA. The matrix is lower triangular, with the diagonal elements all equal to 1.000000. The off-diagonal elements represent the correlations between the variables.

	PRICE	HOUSE	DIST	AREA
PRICE	1.000000	----	----	----
HOUSE	0.673724	1.000000	----	----
DIST	-0.547239	-0.541391	1.000000	----
AREA	0.576627	0.603486	-0.159648	1.000000

The bottom status bar of the EViews window shows the following information: Path = c:\users\наталья поповская\documents DB = none WF = villa



# Построение диаграммы рассеяния [1, house-price]

The screenshot shows the EViews software interface. The main window title is "EViews". The menu bar includes "File", "Edit", "Object", "View", "Proc", "Quick", "Options", "Add-ins", "Window", and "Help".

The "Object" window is active, showing a list of objects for the workfile "VILLA". The objects listed are: area, c, descr\_stat, dist, eco, house, matrix, n, price, and resid. The "house" object is selected. A context menu is open over the "house" object, showing options: Open, Copy (Ctrl+C), Copy Special..., Paste (Ctrl+V), Paste Special..., Manage Links & Formulae..., Fetch from DB..., Update from DB..., Store to DB..., Export to file..., Rename..., and Delete. The "Open" option is expanded, showing sub-options: as Group, as Equation..., as Factor..., as VAR..., as System..., and as Multiple series.

The status bar at the bottom right shows: Path = c:\users\наталья поповская\documents | DB = none | WF = villa

# Построение диаграммы рассеяния [2, house-price]

The screenshot shows the EViews software interface. The main window displays a data table with the following columns: View, Proc, Object, Print, Name, Freeze, Default, Sort, Edit+/-, Smpl+/-, and Compare+/. The data is organized into two groups: 'HOUSE' and 'PRICE'. The 'HOUSE' group contains variables 'c' (area) and 'n' (matrix). The 'PRICE' group contains variables 'price' and 'resid'. The data table shows 23 rows of observations, with columns for 'HOUSE' and 'PRICE' values.

View	Proc	Object	Print	Name	Freeze	Default	Sort	Edit+/-	Smpl+/-	Compare+/-
		HOUSE		PRICE						
		HOUSE		PRICE						
1			400	300.0						
2			170	60.0						
3			60	14.0						
4			65	38.0						
5			320	85.0						
6			210	85.0						
7			60	28.0						
8			228	83.0						
9			200	80.0						
10			36	15.0						
11			180	27.0						
12			250	42.0						
13			36	5.5						
14			285	47.0						
15			36	5.0						
16			420	59.0						
17			130	27.0						
18			350	270.0						
19			300	96.0						
20			200	95.0						
21			36	6.0						
22			300	120.0						
23			170	100.0						

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Построение диаграммы рассеяния [3, house-price]

The screenshot shows the EViews software interface. The main window displays a list of objects on the left, including 'area', 'c', 'descr\_stat', 'dist', 'eco', 'house', 'matrix', 'n', 'price', and 'resid'. The 'price' object is selected. A context menu is open over the 'price' object, showing various analysis options. The 'Graph...' option is highlighted. The background of the main window is a light blue gradient.

Workfile: VILLA - (c:\users\наталья поповская\desktop\рудн\4 курс, 7 сем... - □ X

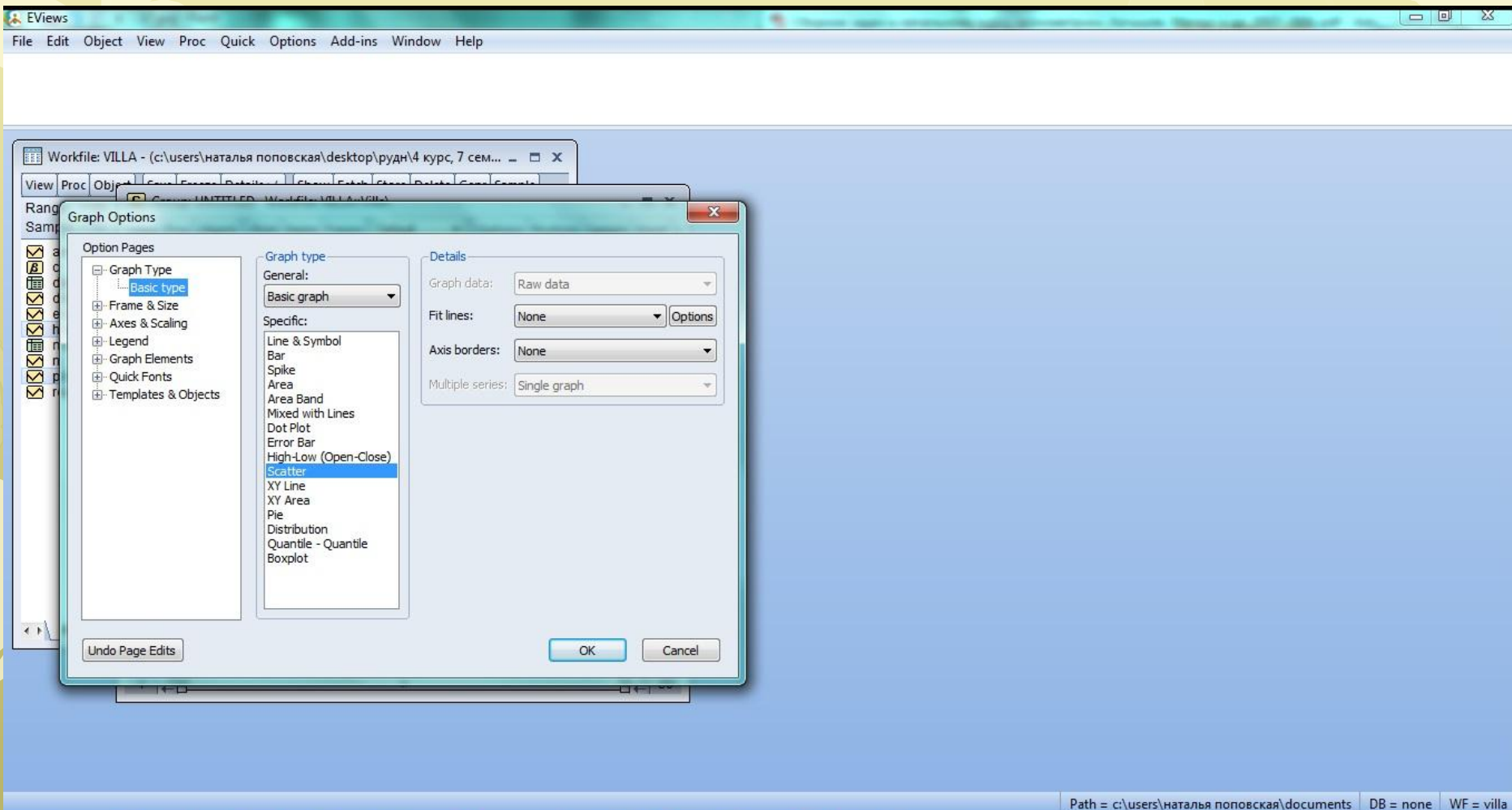
View Proc Object Print Name Freeze Default Sort Edit+/- Smpl+/- Compare+/-

Group: UNTITLED Workfile: VILLA::Villa\

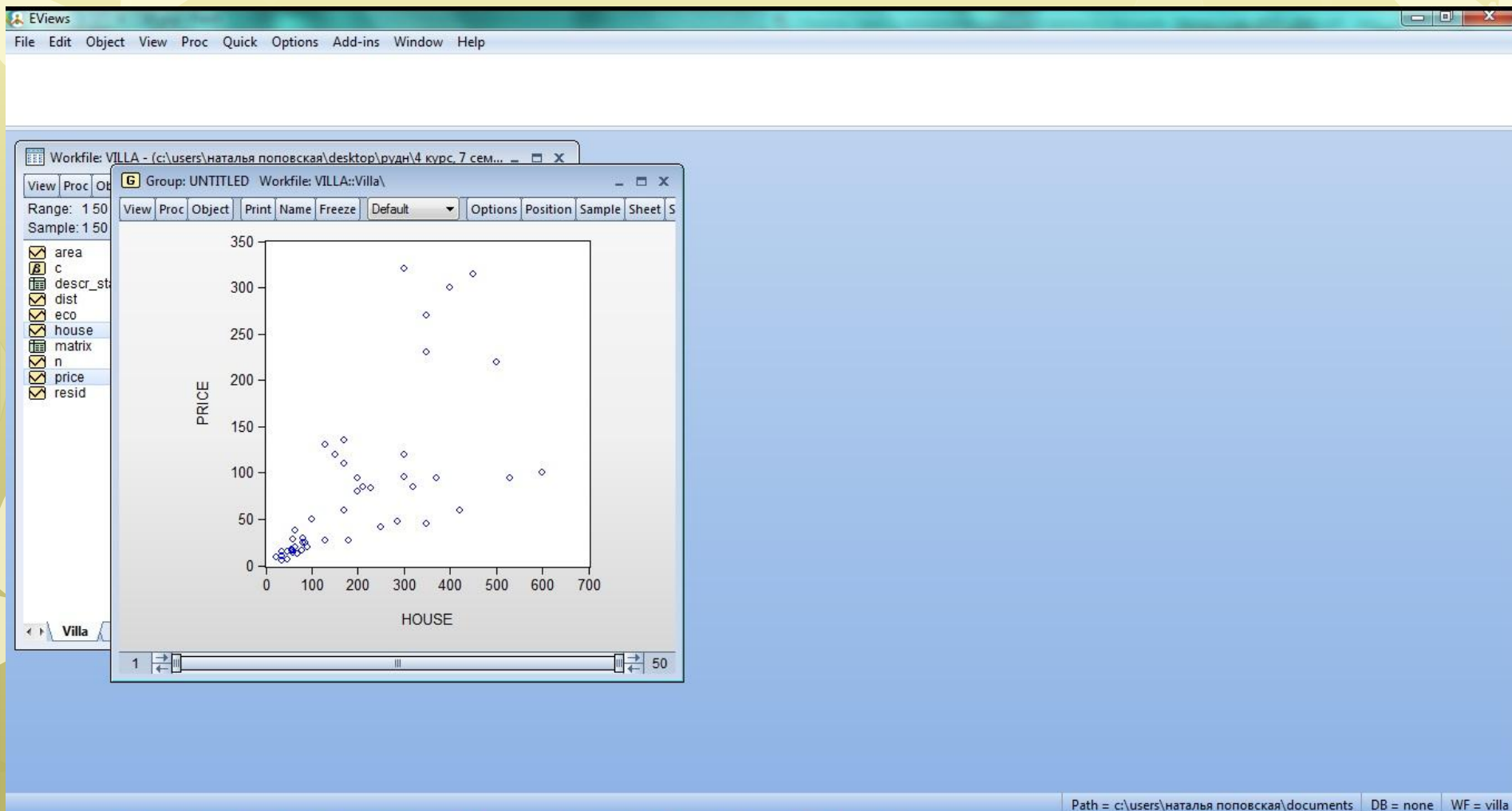
- Group Members
- Spreadsheet
- Dated Data Table
- Graph...
- Descriptive Stats
- Covariance Analysis...
- N-Way Tabulation...
- Tests of Equality...
- Principal Components...
- Correlogram (1) ...
- Cross Correlation (2) ...
- Long-run Covariance...
- Unit Root Test...
- Cointegration Test
- Granger Causality...
- Label

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Построение диаграммы рассеяния [4, house-price]



# Построение диаграммы рассеяния [5, house-price]



# Создание Inprice и Inhouse в командной строке командой `genr Inprice=log(price)` и `genr Inhouse=log(house)`

The screenshot displays the EViews software interface. At the top, the command window shows the following commands:

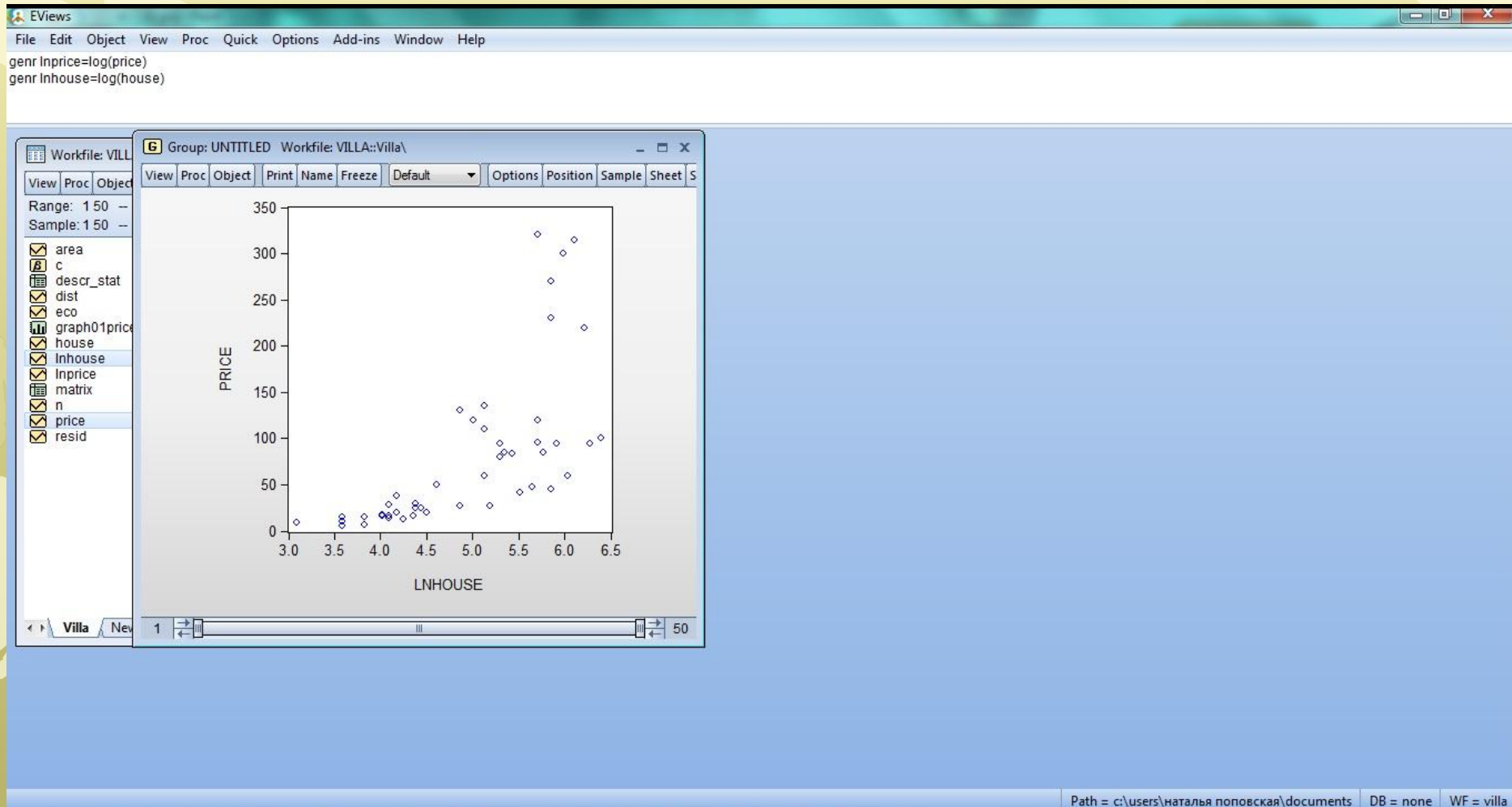
```
genr Inprice=log(price)  
genr Inhouse=log(house)
```

The main workspace shows a list of objects with the following details:

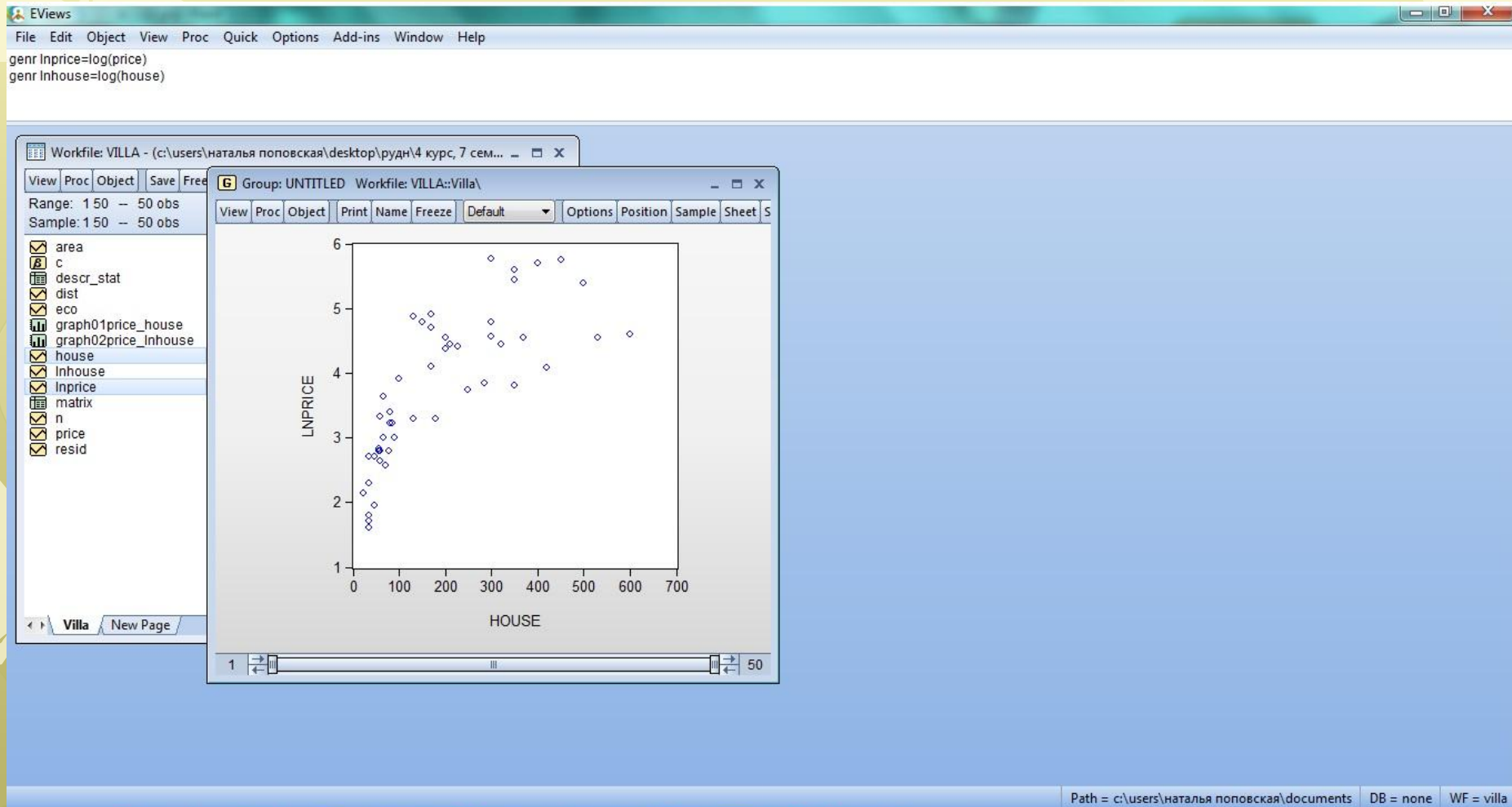
- View Proc Object Save Freeze Details+/- Show Fetch Store Delete Genr Sample
- Range: 1 50 -- 50 obs Filter: \*
- Sample: 1 50 -- 50 obs Order: Name
- area
- c
- descr\_stat
- dist
- eco
- graph01price\_house
- house
- Inhouse
- Inprice
- matrix
- n
- price
- resid

At the bottom of the interface, a status bar indicates: `LNHOUSE successfully computed.` The path is `c:\users\наталья поповская\documents`, the database is `DB = none`, and the workfile is `WF = villa`.

# Диаграмма рассеяния Inhouse-price

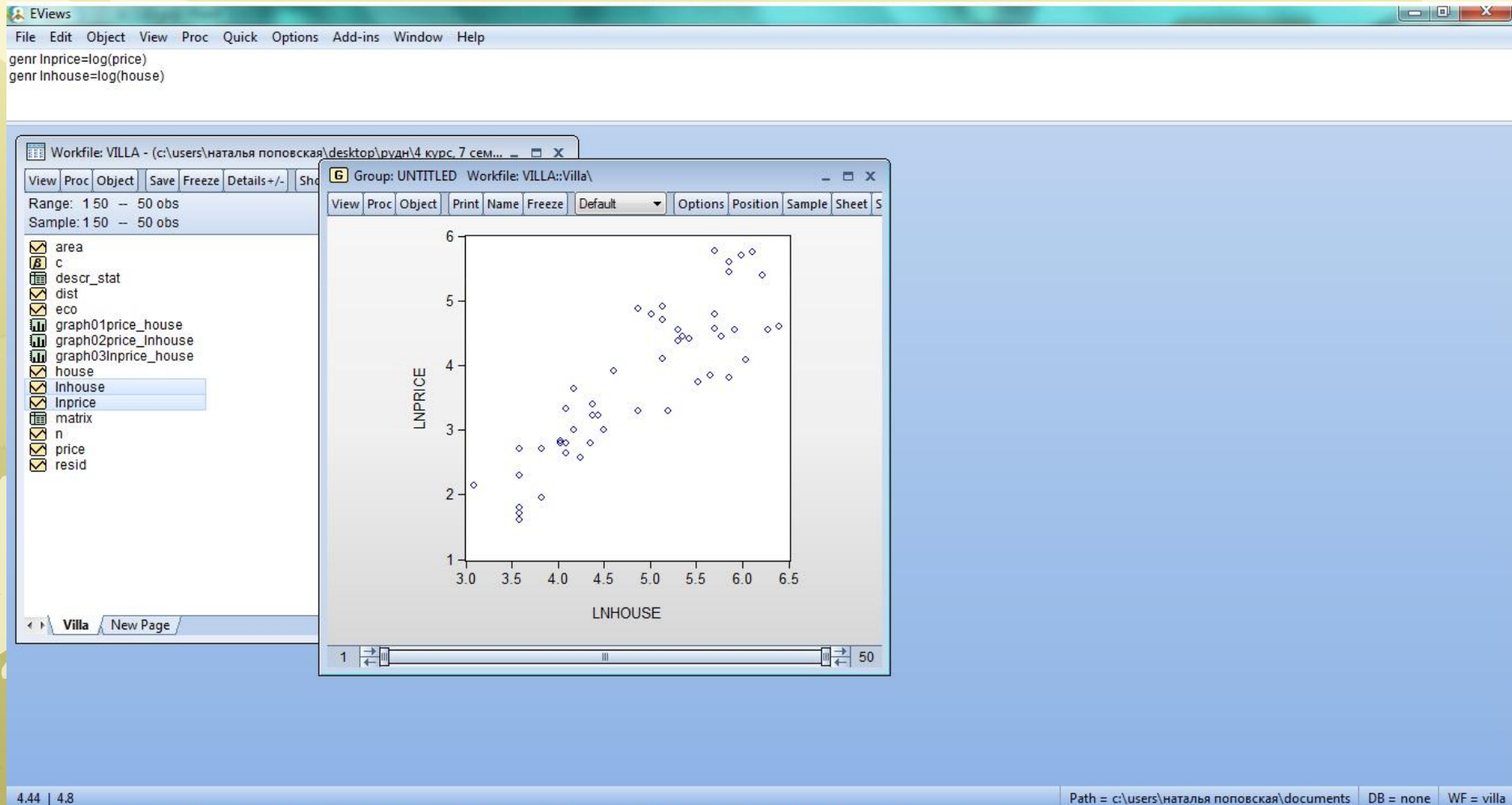


# Диаграмма рассеяния house-Inprice

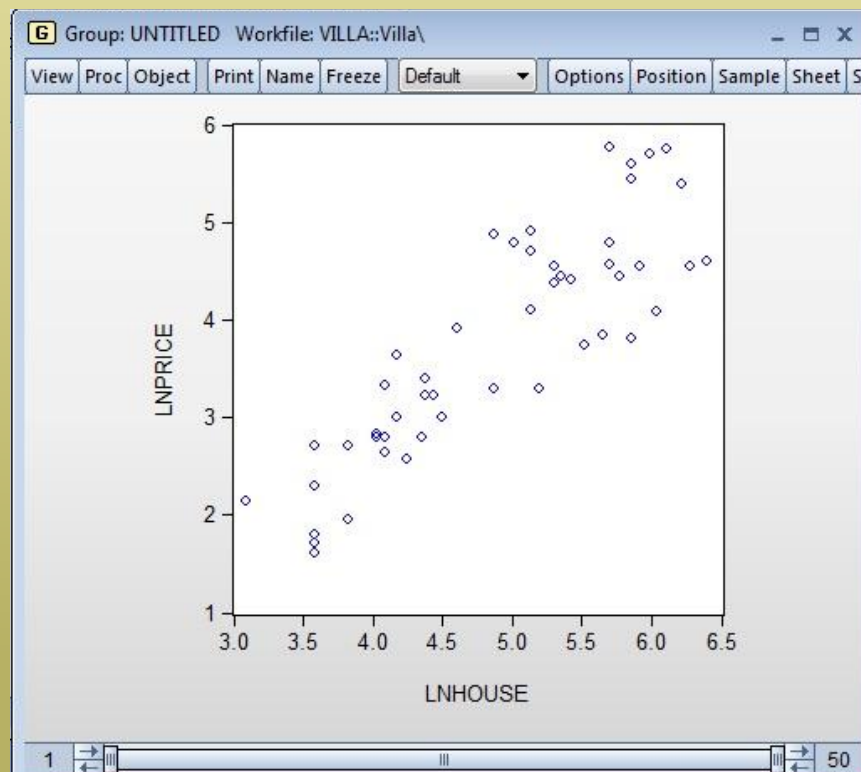




# Диаграмма рассеяния Inhouse-Inprice



- Проанализировав диаграммы рассеяния, мы приходим к выводу, что самой хорошей функциональной формой будет логарифмическая функция( 4-я диаграмма рассеяния Lnhouse-Inprice)
- Перейдем к построению моделей



# 1. Линейная модель. Построение [1]

The screenshot displays the EViews software interface. The main window title is "EViews". The menu bar includes "File", "Edit", "Object", "View", "Proc", "Quick", "Options", "Add-ins", "Window", and "Help". The workfile is named "Villa" and is located at "c:\users\наталья поповская\desktop\рудн\4 курс, 7 сем...". The range and sample are both set to "1 50 -- 50 obs". The filter is "\*" and the order is "Name".

A context menu is open over the object "c" in the left-hand list. The menu options are:

- Open
  - as Group
  - as Equation...
  - as Factor...
  - as VAR...
  - as System...
  - as Multiple series
- Copy (Ctrl+C)
- Copy Special...
- Paste (Ctrl+V)
- Paste Special...
- Manage Links & Formulae...
- Fetch from DB...
- Update from DB...
- Store to DB...
- Export to file...
- Rename...
- Delete

# 1. Линейная модель. Построение [2]

The screenshot shows the EViews software interface. The main window displays a list of objects in the left pane, including 'area', 'c', 'descr\_stat', 'dist', 'eco', 'graph01price\_house', 'graph02price\_inhouse', 'graph03Inprice\_house', 'graph04Inprice\_inhouse', 'house', 'Inhouse', 'Inprice', 'matrix', 'n', 'price', and 'resid'. The 'Equation Estimation' dialog box is open, showing the 'Specification' tab. The 'Equation specification' section contains the text 'price house eco dist area c'. The 'Estimation settings' section shows the 'Method' set to 'LS - Least Squares (NLS and ARMA)' and the 'Sample' set to '1 50'. The dialog has 'OK' and 'Отмена' buttons at the bottom.

Workfile: VILLA - (c:\users\наталья поповская\desktop\рудн\4 курс, 7 сем... -

View Proc Object Save Freeze Details+/- Show Fetch Store Delete Genr

Range: 1 50 -- 50 obs  
Sample: 1 50 -- 50 obs

Equation Estimation

Specification Options

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

price house eco dist area c

Estimation settings

Method: LS - Least Squares (NLS and ARMA)

Sample: 1 50

OK Отмена

Villa New Page

Path = c:\users\наталья поповская\documents DB = none WF = villa

# 1. Линейная модель. Построение [3]

- В линейную модель включаем переменные без логарифмов. Все коэффициенты значимы (Prob<0.05, у Const не учитываем).  $R^2=0,631855$ ,  $adj^2=0.599131$ , модель значима

Equation: UNTITLED Workfile: VILLA::Villa\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: PRICE  
Method: Least Squares  
Date: 11/15/15 Time: 23:44  
Sample: 1 50  
Included observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HOUSE	0.174870	0.076928	2.273158	0.0278
ECO	42.32426	16.37843	2.584146	0.0131
DIST	-0.738748	0.340995	-2.166450	0.0356
AREA	3.461873	1.470687	2.353916	0.0230
C	8.411994	26.37256	0.318968	0.7512

R-squared 0.631855 Mean dependent var 78.25000  
Adjusted R-squared 0.599131 S.D. dependent var 84.34322  
S.E. of regression 53.40126 Akaike info criterion 10.88819  
Sum squared resid 128326.3 Schwarz criterion 11.07939  
Log likelihood -267.2046 Hannan-Quinn criter. 10.96100  
F-statistic 19.30859 Durbin-Watson stat 1.425846  
Prob(F-statistic) 0.000000

Path = c:\users\наталья поповская\documents DB = none WF = villa

# 1. Линейная модель

## Вывод уравнения [1]

Equation: UNTITLED Workfile: VILLA::Villa\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Representations

Estimation Output

Actual, Fitted, Residual

ARMA Structure...

Gradients and Derivatives

	Std. Error	t-Statistic	Prob.
Covariance Matrix			
Mean dependent var	0.076928	2.273158	0.0278
S.D. dependent var	16.37843	2.584146	0.0131
Adjusted R-squared	0.340995	-2.166450	0.0356
S.E. of regression	1.470687	2.353916	0.0230
Sum squared resid	26.37256	0.318968	0.7512
Log likelihood			
F-statistic			
Prob(F-statistic)			

Label

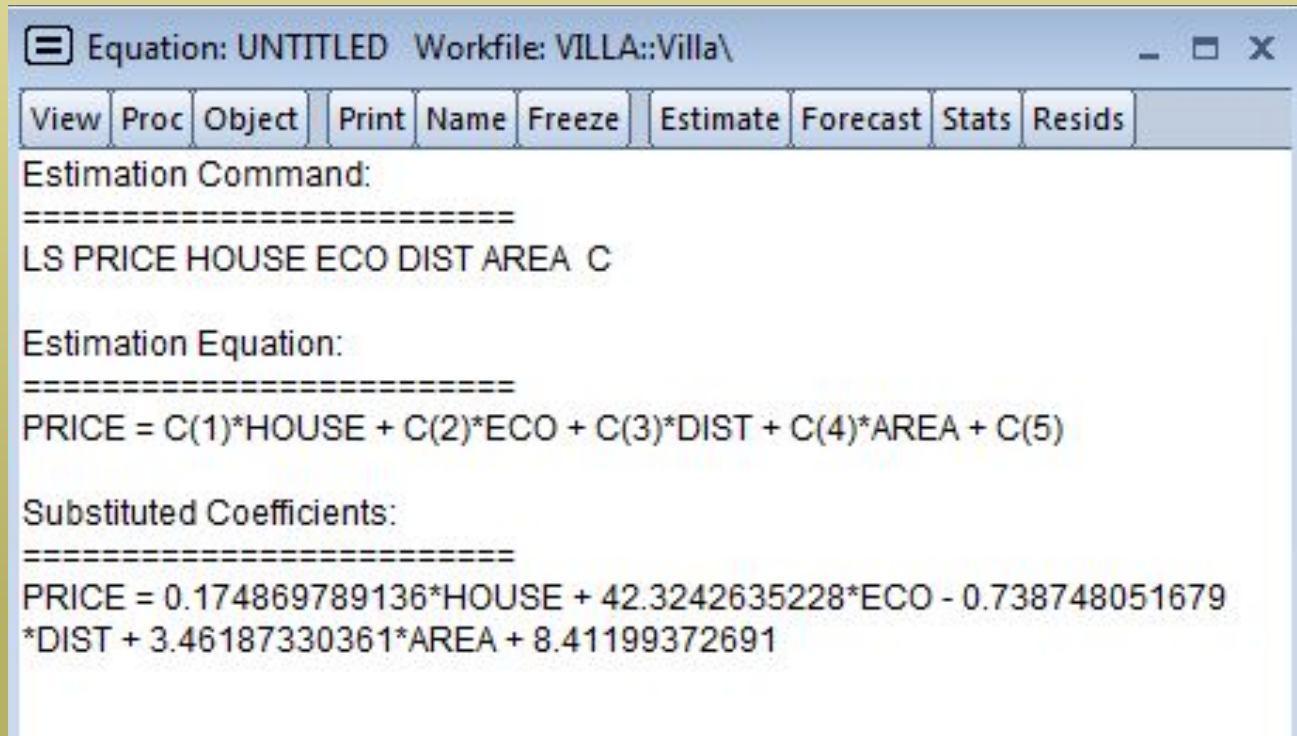
Mean dependent var	78.25000
S.D. dependent var	84.34322
Akaike info criterion	10.88819
Schwarz criterion	11.07939
Hannan-Quinn criter.	10.96100
Durbin-Watson stat	1.425846

Path = c:\users\наталья поповская\documents DB = none WF = villa

# 1. Линейная модель

## Вывод уравнения [2]. Интерпретация [1]

- $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n$
- При возрастании  $x_j$  на 1 единицу (своего измерения),  $y$  возрастает на  $\beta_j$  единиц (своего измерения)



The screenshot shows a software window titled "Equation: UNTITLED Workfile: VILLA::Villa\" with a menu bar containing "View", "Proc", "Object", "Print", "Name", "Freeze", "Estimate", "Forecast", "Stats", and "Resids". The main content area displays the following text:

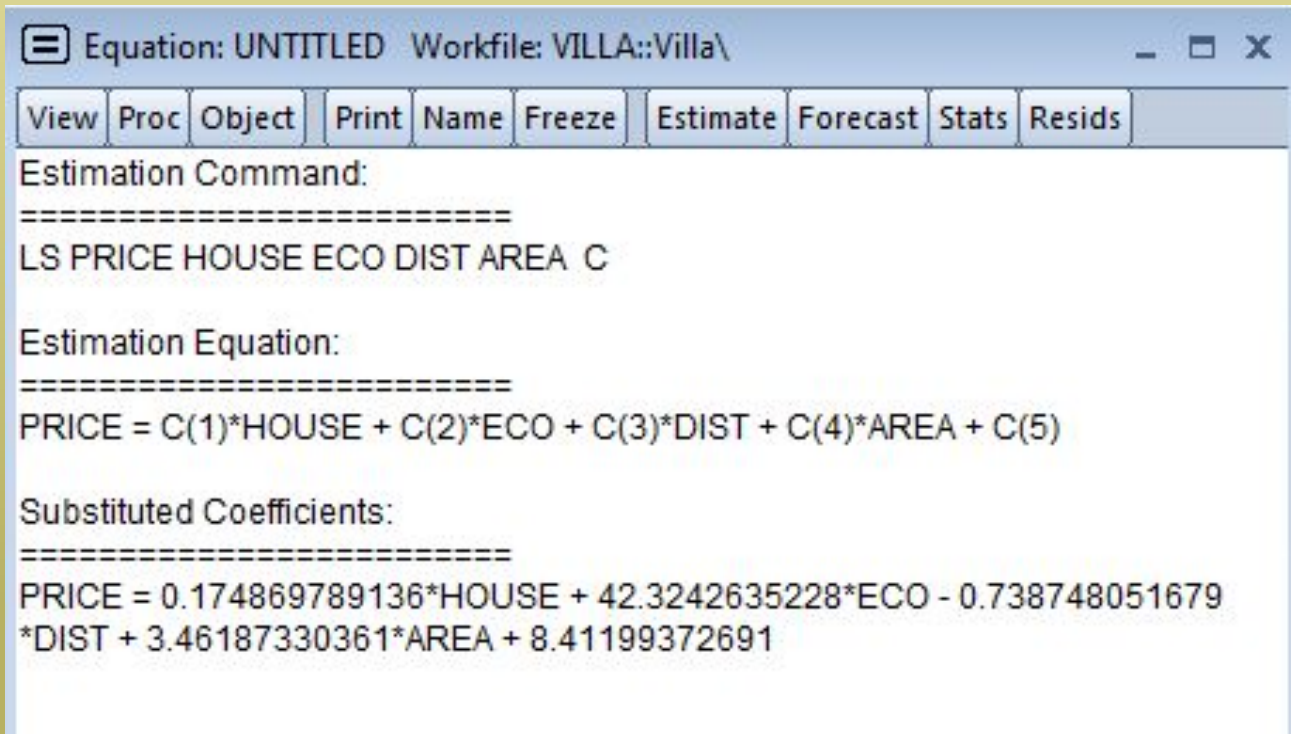
```
Estimation Command:
=====
LS PRICE HOUSE ECO DIST AREA C

Estimation Equation:
=====
PRICE = C(1)*HOUSE + C(2)*ECO + C(3)*DIST + C(4)*AREA + C(5)

Substituted Coefficients:
=====
PRICE = 0.174869789136*HOUSE + 42.3242635228*ECO - 0.738748051679
*DIST + 3.46187330361*AREA + 8.41199372691
```

# 1. Линейная модель. Интерпретация [2]

- dist – при увеличении расстояния на 1 км цена коттеджа падает на 739\$
- house – при увеличении площади дома на 1 кв.м цена коттеджа увеличивается на 175\$



The screenshot shows a software window titled "Equation: UNTITLED Workfile: VILLA::Villa\". The window has a menu bar with options: View, Proc, Object, Print, Name, Freeze, Estimate, Forecast, Stats, Resids. The main content area displays the following text:

```
Estimation Command:
=====
LS PRICE HOUSE ECO DIST AREA C

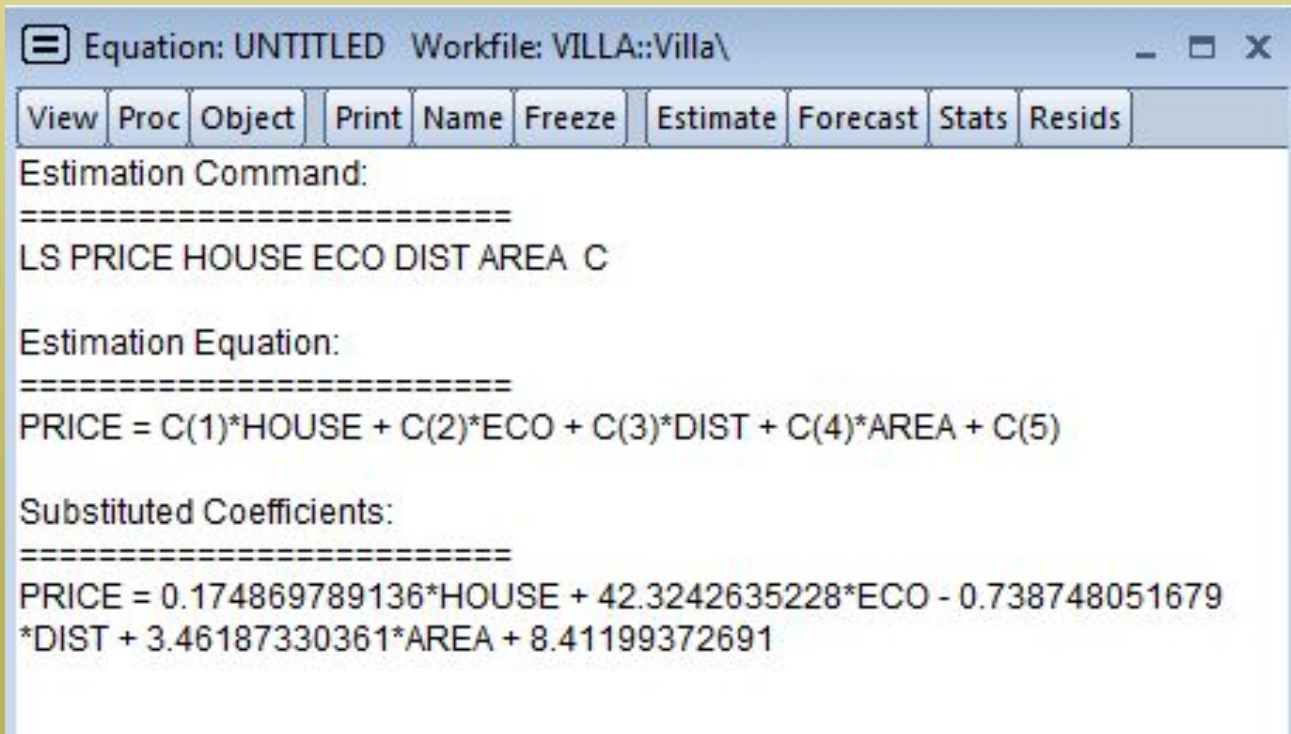
Estimation Equation:
=====
PRICE = C(1)*HOUSE + C(2)*ECO + C(3)*DIST + C(4)*AREA + C(5)

Substituted Coefficients:
=====
PRICE = 0.174869789136*HOUSE + 42.3242635228*ECO - 0.738748051679
*DIST + 3.46187330361*AREA + 8.41199372691
```



# 1. Линейная модель. Интерпретация [3]

- eco – если рядом есть реки и озера, то цена возрастает на 42 тыс \$
- area – при увеличении площади участка на 1 сотку цена увеличивается на 3462 \$



The screenshot shows a software window titled "Equation: UNTITLED Workfile: VILLA::Villa\". The window has a menu bar with options: View, Proc, Object, Print, Name, Freeze, Estimate, Forecast, Stats, Resids. The main content area displays the following text:

```
Estimation Command:
=====
LS PRICE HOUSE ECO DIST AREA C

Estimation Equation:
=====
PRICE = C(1)*HOUSE + C(2)*ECO + C(3)*DIST + C(4)*AREA + C(5)

Substituted Coefficients:
=====
PRICE = 0.174869789136*HOUSE + 42.3242635228*ECO - 0.738748051679
*DIST + 3.46187330361*AREA + 8.41199372691
```

## 2. Полулогарифмическая модель (log(y)). Построение [1]

The screenshot displays the EViews software interface. The main window shows a list of objects on the left, including 'area', 'c', 'descr\_stat', 'dist', 'eco', 'graph01price\_house', 'graph02price\_inhouse', 'graph03Inprice\_hous', 'graph04Inprice\_Inho', 'house', 'Inhouse', 'Inprice', 'matrix', 'n', 'price', and 'resid'. The 'Equation: UNTITLED' window is open, showing the specification of a semi-logarithmic model. The equation is defined as:

$$\text{PRICE} = \beta_0 + \beta_1 \ln(\text{AREA}) + \beta_2 \text{ECO} + \beta_3 \text{DIST}$$

The coefficients are estimated as follows:

Variable	Coefficient
Intercept	2635228
ECO	-0.738748051679
DIST	2691

The 'Estimate' menu is open, showing options such as 'Specify/Estimate...', 'Forecast...', 'Make Residual Series...', 'Make Regressor Group', 'Make Gradient Group', 'Make Derivative Group', 'Make Model', 'Update Coefs from Equation', and 'Add-ins'. The status bar at the bottom indicates 'Line: 11', 'Path = c:\users\наталья поповская\documents', 'DB = none', and 'WF = villa'.

## 2. Полулогарифмическая модель (log(y)). Построение [2]

The screenshot displays the EViews software interface. The main window title is "EViews" and the menu bar includes "File", "Edit", "Object", "View", "Proc", "Quick", "Options", "Add-ins", "Window", and "Help". The workfile is "VILLA - (c:\...)" with a range of 150 observations. The left-hand pane lists several objects, including "area", "c", "descr\_stat", "dist", "eco", "house", "Inhouse", "Inprice", "matrix", "n", "price", and "resid".

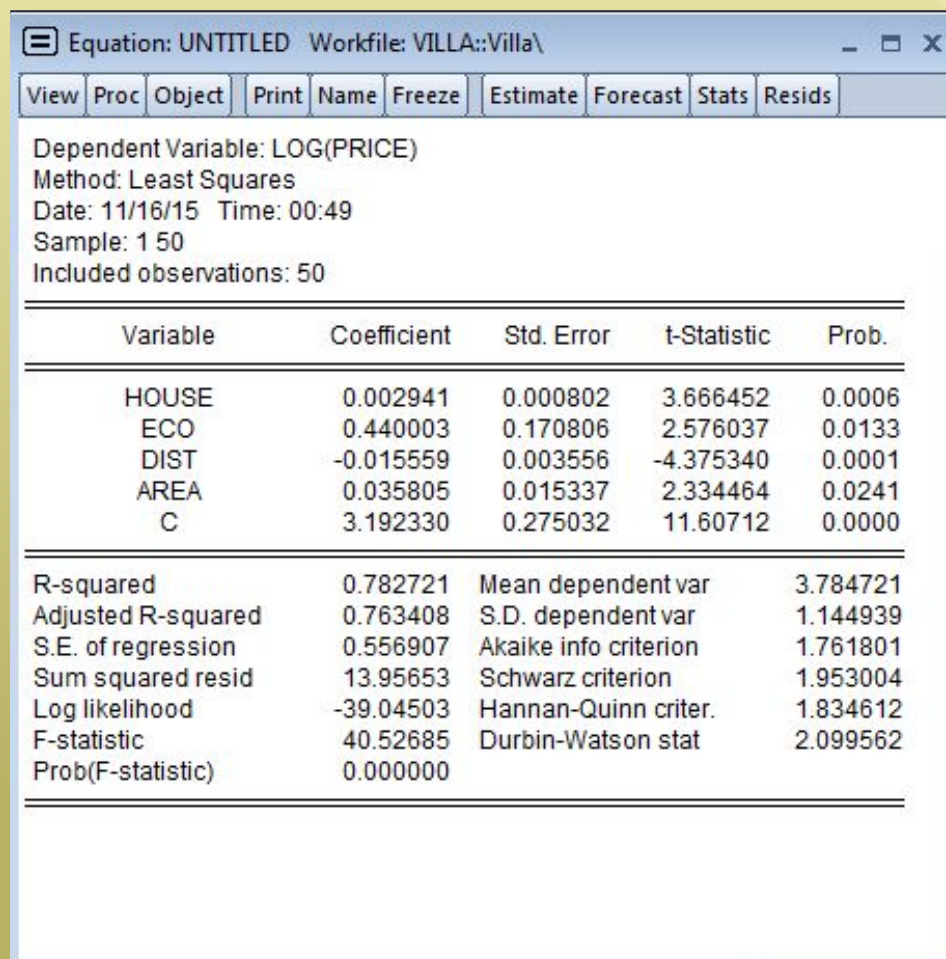
The "Equation Estimation" dialog box is open, showing the following details:

- Title:** Equation: UNTITLED Workfile: VILLA::Villa\
- Specification:** log(price) house eco dist area c
- Estimation settings:** Method: LS - Least Squares (NLS and ARMA), Sample: 1 50

Buttons for "OK" and "Отмена" (Cancel) are visible at the bottom of the dialog. The status bar at the bottom of the EViews window shows "Path = c:\users\наталья поповская\documents DB = none WF = villa".

## 2. Полулогарифмическая модель ( $\log(y)$ ). Построение [3]

- Коэффициенты значимы ( $\text{Prob} < 0.05$ ),  $R^2 = 0.782721$ ,  $\text{adj}R^2 = 0.763408$ , заметим, что они выше, чем у линейной модели. Модель значима.



Equation: UNTITLED Workfile: VILLA.:Villa\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: LOG(PRICE)  
Method: Least Squares  
Date: 11/16/15 Time: 00:49  
Sample: 1 50  
Included observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HOUSE	0.002941	0.000802	3.666452	0.0006
ECO	0.440003	0.170806	2.576037	0.0133
DIST	-0.015559	0.003556	-4.375340	0.0001
AREA	0.035805	0.015337	2.334464	0.0241
C	3.192330	0.275032	11.60712	0.0000

R-squared	0.782721	Mean dependent var	3.784721
Adjusted R-squared	0.763408	S.D. dependent var	1.144939
S.E. of regression	0.556907	Akaike info criterion	1.761801
Sum squared resid	13.95653	Schwarz criterion	1.953004
Log likelihood	-39.04503	Hannan-Quinn criter.	1.834612
F-statistic	40.52685	Durbin-Watson stat	2.099562
Prob(F-statistic)	0.000000		

## 2. Полулогарифмическая модель (log(y)). Вывод уравнения. Интерпретация [1]

- $\ln(y) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n$
- При изменении  $x_j$  на 1 единицу,  $y$  меняется на  $(e^{\beta_j} - 1) * 100\%$  (при малых  $-0.2 < \beta_j < 0.2$  это примерно равно  $\beta_j * 100\%$ )

```
Equation: UNTITLED Workfile: VILLA::Villa\
View Proc Object Print Name Freeze Estimate Forecast Stats Resids
Estimation Command:
=====
LS LOG(PRICE) HOUSE ECO DIST AREA C

Estimation Equation:
=====
LOG(PRICE) = C(1)*HOUSE + C(2)*ECO + C(3)*DIST + C(4)*AREA + C(5)

Substituted Coefficients:
=====
LOG(PRICE) = 0.00294145354071*HOUSE + 0.440002745825*ECO -
0.0155593082047*DIST + 0.0358045585599*AREA + 3.19232963887
```

## 2. Полулогарифмическая модель ( $\log(y)$ ). Интерпретация [2]

- house - при изменении площади дома на 1 кв.м цена меняется на 0.29% (т.к.  $-0.2 < \beta_j < 0.2$ )
- eco – если рядом есть реки и озера, то цена увеличивается на 55%

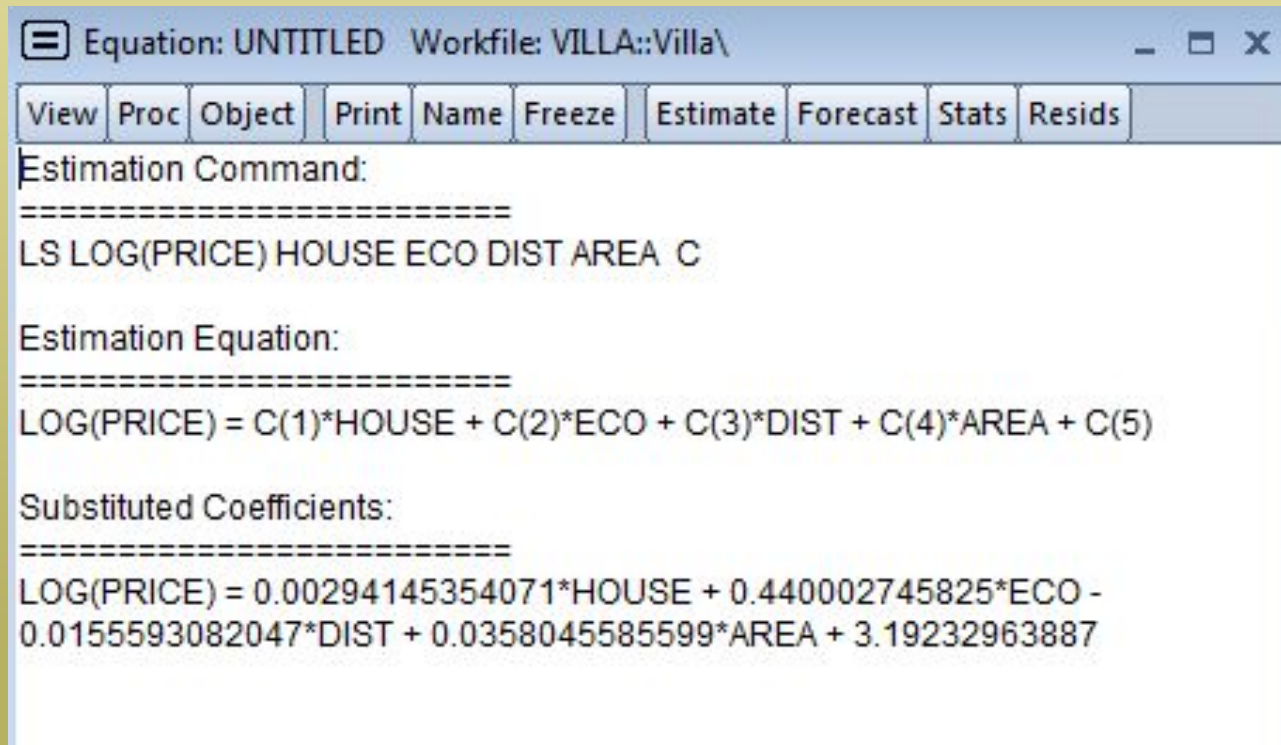
```
Equation: UNTITLED Workfile: VILLA::Villa\
View Proc Object Print Name Freeze Estimate Forecast Stats Resids
Estimation Command:
=====
LS LOG(PRICE) HOUSE ECO DIST AREA C

Estimation Equation:
=====
LOG(PRICE) = C(1)*HOUSE + C(2)*ECO + C(3)*DIST + C(4)*AREA + C(5)

Substituted Coefficients:
=====
LOG(PRICE) = 0.00294145354071*HOUSE + 0.440002745825*ECO -
0.0155593082047*DIST + 0.0358045585599*AREA + 3.19232963887
```

## 2. Полулогарифмическая модель (log(y)). Интерпретация [3]

- dist – при увеличении расстояния на 1 км цена снижается на 1.6% (т.к.  $-0.2 < \beta_j < 0.2$ )
- area – при увеличении площади участка на 1 сотку цена меняется на 3.6%



The screenshot shows a software window titled "Equation: UNTITLED Workfile: VILLA::Villa\" with standard window controls. Below the title bar is a menu bar with options: View, Proc, Object, Print, Name, Freeze, Estimate, Forecast, Stats, Resids. The main content area displays the following text:

```
Estimation Command:
=====
LS LOG(PRICE) HOUSE ECO DIST AREA C

Estimation Equation:
=====
LOG(PRICE) = C(1)*HOUSE + C(2)*ECO + C(3)*DIST + C(4)*AREA + C(5)

Substituted Coefficients:
=====
LOG(PRICE) = 0.00294145354071*HOUSE + 0.440002745825*ECO -
0.0155593082047*DIST + 0.0358045585599*AREA + 3.19232963887
```

# 3. Полулогарифмическая модель ( $\log(x)$ ). Построение [1]

The screenshot displays the EViews software interface. The main window is titled "Equation: UNTITLED" and is open over a workfile named "VILLA". The "Equation Estimation" dialog box is open, showing the "Specification" tab. The dependent variable is "price" and the list of regressors includes "log(house)", "eco", "log(dist)", "log(area)", and "c". The "Estimation settings" section shows the method set to "LS - Least Squares (NLS and ARMA)" and the sample range from 1 to 50. The background shows the EViews interface with a list of objects on the left and a menu bar at the top.

Equation Estimation

Specification Options

Equation specification

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

price log(house) eco log(dist) log(area) c

Estimation settings

Method: LS - Least Squares (NLS and ARMA)

Sample: 1 50

OK Отмена

Path = c:\users\наталья поповская\documents DB = none WF = villa



# 3. Полулогарифмическая модель ( $\log(x)$ ). Построение [2]

- Коэффициенты значимы ( $\text{Prob} < 0.05$ , у Const не учитываем).  $R^2 = 0.641281$ ,  $\text{adj } R^2 = 0.609395$ , заметим, что  $R^2$  ниже, чем у полулогарифмической ( $\log(y)$ ), но выше, чем у линейной. Модель значима.

Equation: UNTITLED Workfile: VILLA::Villa\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: PRICE  
Method: Least Squares  
Date: 11/16/15 Time: 01:16  
Sample: 1 50  
Included observations: 50

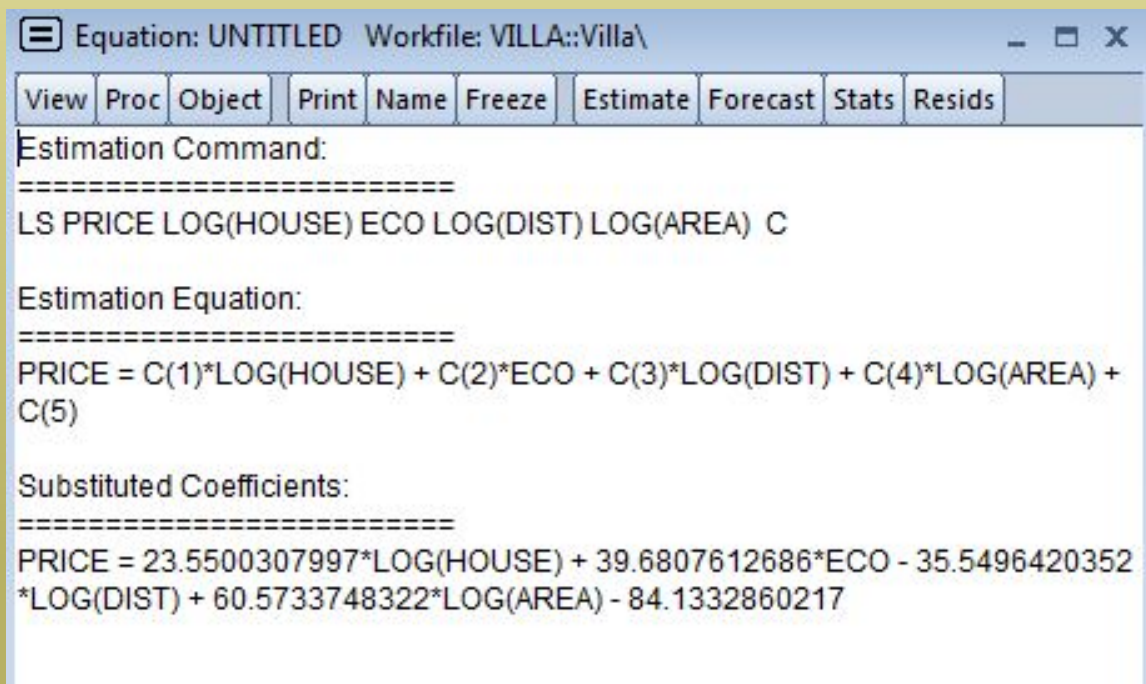
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(HOUSE)	23.55003	11.19622	2.103391	0.0411
ECO	39.68076	14.31986	2.771029	0.0081
LOG(DIST)	-35.54964	9.666786	-3.677504	0.0006
LOG(AREA)	60.57337	18.14896	3.337568	0.0017
C	-84.13329	67.45095	-1.247325	0.2187

R-squared	0.707498	Mean dependent var	78.25000
Adjusted R-squared	0.681498	S.D. dependent var	84.34322
S.E. of regression	47.59995	Akaike info criterion	10.65818
Sum squared resid	101959.0	Schwarz criterion	10.84938
Log likelihood	-261.4545	Hannan-Quinn criter.	10.73099
F-statistic	27.21125	Durbin-Watson stat	1.708642
Prob(F-statistic)	0.000000		

### 3. Полулогарифмическая модель (log(x)). Вывод уравнения. Интерпретация [1]

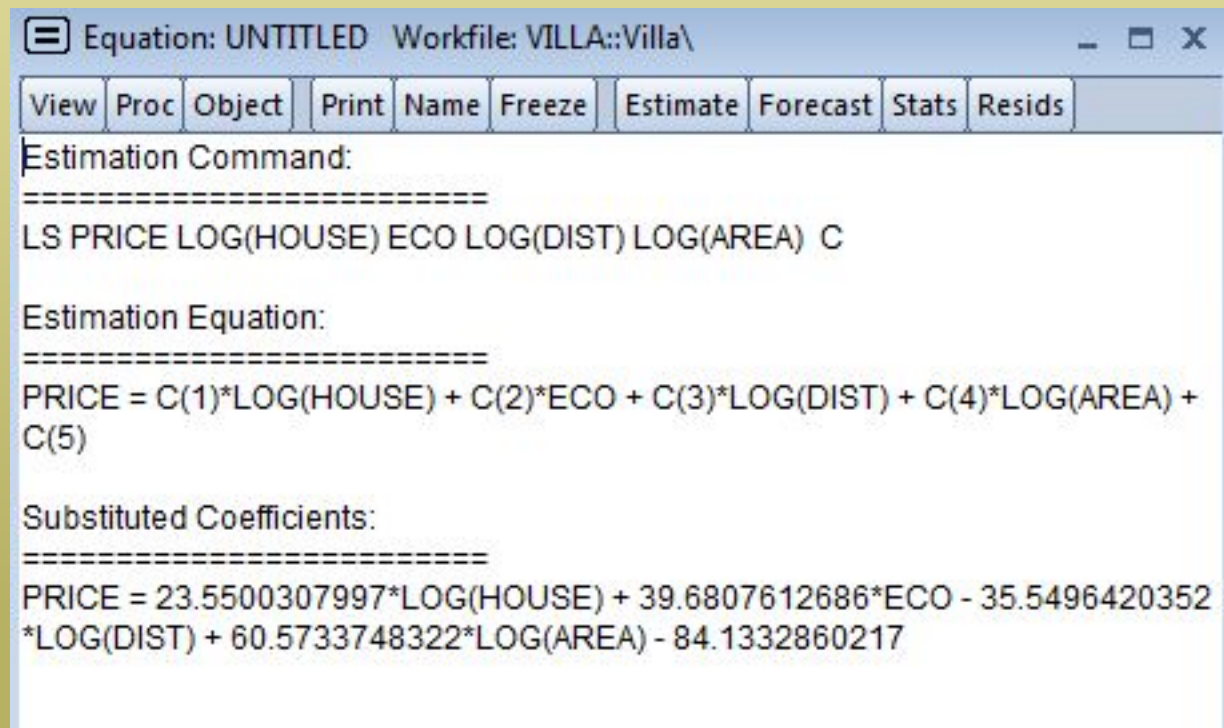
- $y = \beta_0 + \beta_1 \ln(x_1) + \beta_2 \ln(x_2) + \dots + \beta_n \ln(x_n)$
- При изменении  $x_j$  на 1 %,  $y$  меняется в среднем на  $\beta_j/100$  единиц измерения



```
Equation: UNTITLED  Workfile: VILLA::Villa\
View Proc Object Print Name Freeze Estimate Forecast Stats Resids
Estimation Command:
=====
LS PRICE LOG(HOUSE) ECO LOG(DIST) LOG(AREA) C
Estimation Equation:
=====
PRICE = C(1)*LOG(HOUSE) + C(2)*ECO + C(3)*LOG(DIST) + C(4)*LOG(AREA) +
C(5)
Substituted Coefficients:
=====
PRICE = 23.5500307997*LOG(HOUSE) + 39.6807612686*ECO - 35.5496420352
*LOG(DIST) + 60.5733748322*LOG(AREA) - 84.1332860217
```

### 3. Полулогарифмическая модель ( $\log(x)$ ). Вывод уравнения. Интерпретация [2]

- house – при увеличении площади дома на 1 кв.м цена увеличивается на 0.24 тыс \$
- dist – при увеличении расстояния на 1 км цена уменьшится на 0.36 тыс \$



The screenshot shows a software window titled "Equation: UNTITLED Workfile: VILLA::Villa\" with a menu bar containing "View", "Proc", "Object", "Print", "Name", "Freeze", "Estimate", "Forecast", "Stats", and "Resids". The main content area displays the following text:

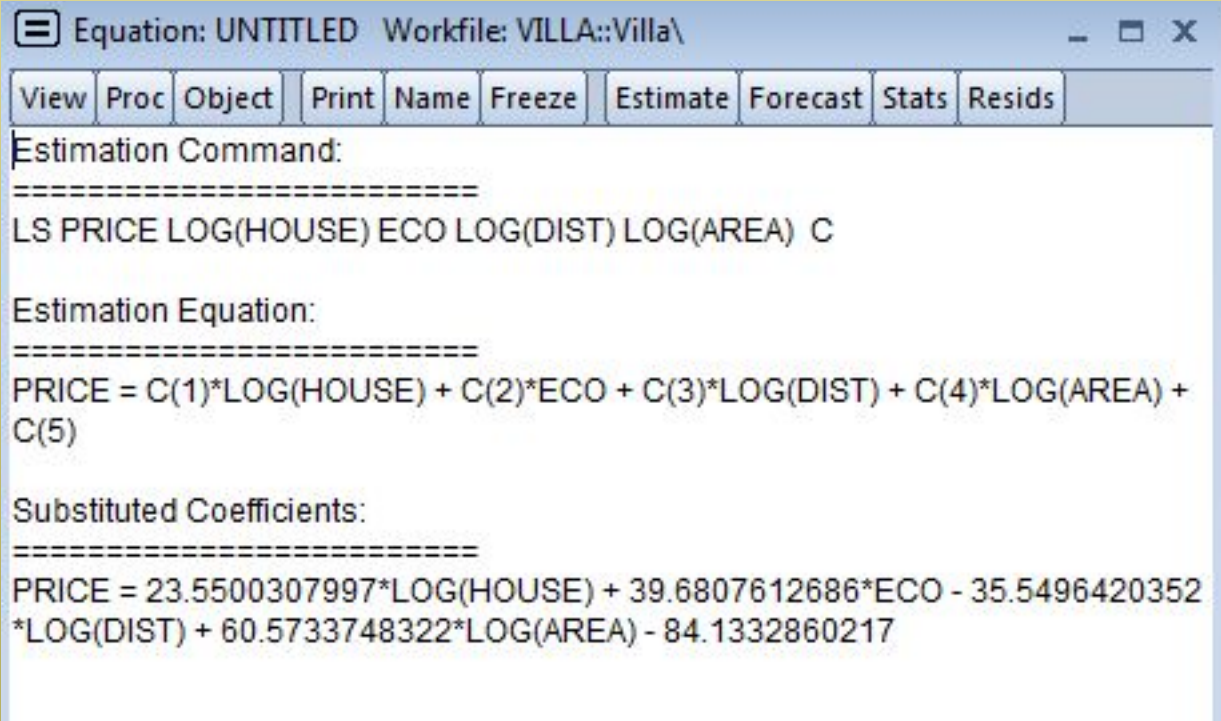
```
Estimation Command:
=====
LS PRICE LOG(HOUSE) ECO LOG(DIST) LOG(AREA) C

Estimation Equation:
=====
PRICE = C(1)*LOG(HOUSE) + C(2)*ECO + C(3)*LOG(DIST) + C(4)*LOG(AREA) +
C(5)

Substituted Coefficients:
=====
PRICE = 23.5500307997*LOG(HOUSE) + 39.6807612686*ECO - 35.5496420352
*LOG(DIST) + 60.5733748322*LOG(AREA) - 84.1332860217
```

### 3. Полулогарифмическая модель (log(x)). Вывод уравнения. Интерпретация [3]

- area – при увеличении площади участка на 1 сотку цена увеличится на 0.6 тыс \$
- eco – если рядом есть реки и озера, то цена увеличивается на 40 тыс \$ (у eco не стоит log, т.к. принимает значения только 0 и 1)



```
Equation: UNTITLED  Workfile: VILLA::Villa\
View Proc Object Print Name Freeze Estimate Forecast Stats Resids
Estimation Command:
=====
LS PRICE LOG(HOUSE) ECO LOG(DIST) LOG(AREA) C

Estimation Equation:
=====
PRICE = C(1)*LOG(HOUSE) + C(2)*ECO + C(3)*LOG(DIST) + C(4)*LOG(AREA) +
C(5)

Substituted Coefficients:
=====
PRICE = 23.5500307997*LOG(HOUSE) + 39.6807612686*ECO - 35.5496420352
*LOG(DIST) + 60.5733748322*LOG(AREA) - 84.1332860217
```

# 4. Логарифмическая модель. Построение [1]

The screenshot displays the EViews software interface. The main window title is "EViews" and the menu bar includes "File", "Edit", "Object", "View", "Proc", "Quick", "Options", "Add-ins", "Window", and "Help". The workfile is "VILLA - (c:\us...)" with a range of 1 50 to 50 observations. A list of objects is visible on the left, including "area", "c", "descr\_stat", "dist", "eco", "graph01price\_house", "graph02price\_inhou", "graph03Inprice\_hou", "graph04Inprice\_Inho", "house", "Inhouse", "Inprice", "matrix", "n", "price", and "resid".

The "Equation Estimation" dialog box is open, showing the following details:

- Equation specification:** log(price) log(house) log(dist) log(area) c
- Estimation settings:** Method: LS - Least Squares (NLS and ARMA), Sample: 1 50

Buttons for "OK" and "Отмена" (Cancel) are visible at the bottom of the dialog.

Path = c:\users\наталья поповская\documents DB = none WF = villa

# 4. Логарифмическая модель. Построение [2]

- Мы не взяли в модель есо, т.к. это фиктивная переменная (принимает значения только 0 и 1) Коэффициенты значимы (Prob<0.05, у Const не учитываем).  $R^2=0.821542$ ,  $adjR^2=0.809904$ , коэффициенты выше, чем у других моделей. Модель значима.

Equation: UNTITLED Workfile: VILLA::Villa\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: LOG(PRICE)  
Method: Least Squares  
Date: 11/16/15 Time: 01:31  
Sample: 1 50  
Included observations: 50

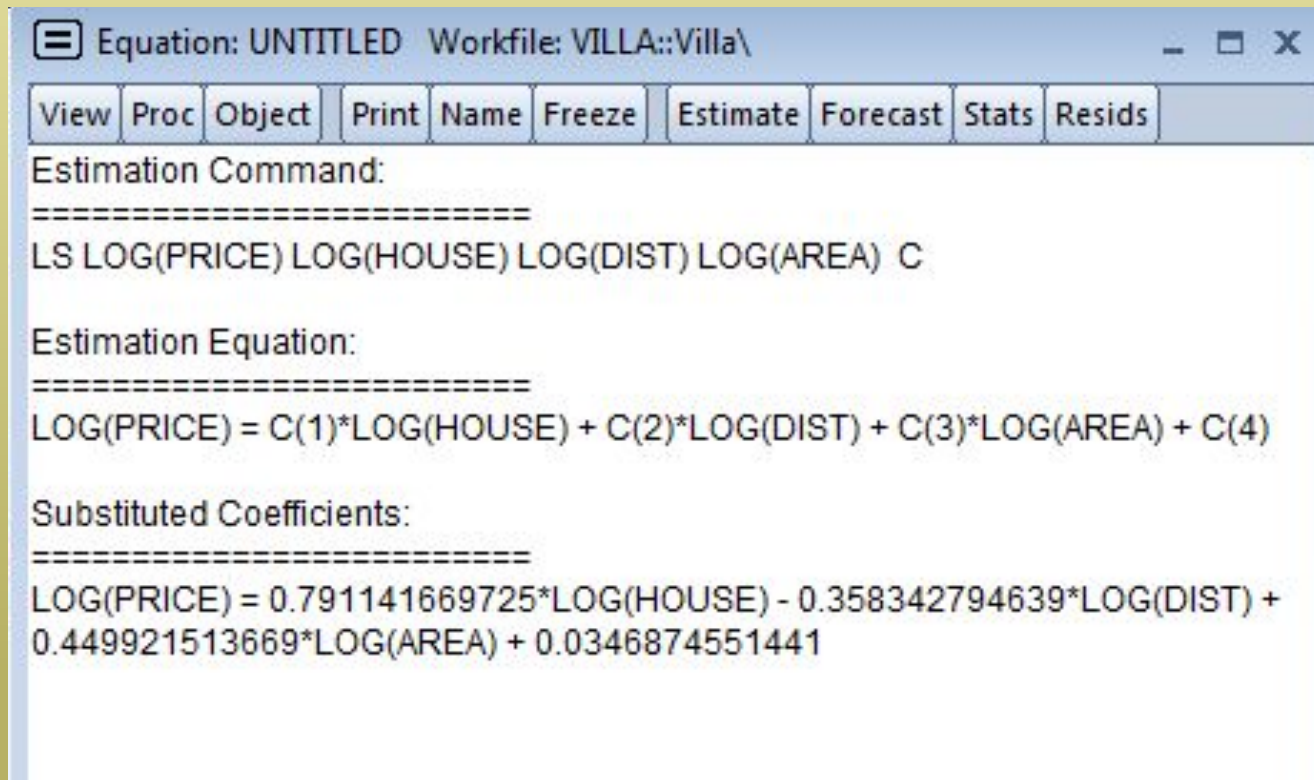
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(HOUSE)	0.791142	0.117151	6.753190	0.0000
LOG(DIST)	-0.358343	0.098157	-3.650692	0.0007
LOG(AREA)	0.449922	0.186367	2.414167	0.0198
C	0.034687	0.699384	0.049597	0.9607

R-squared	0.821542	Mean dependent var	3.784721
Adjusted R-squared	0.809904	S.D. dependent var	1.144939
S.E. of regression	0.499194	Akaike info criterion	1.524973
Sum squared resid	11.46294	Schwarz criterion	1.677935
Log likelihood	-34.12433	Hannan-Quinn criter.	1.583222
F-statistic	70.58799	Durbin-Watson stat	1.776973
Prob(F-statistic)	0.000000		

## 4. Логарифмическая модель. Интерпретация [1]

- $\ln(y) = \beta_0 + \beta_1 \ln(x_1) + \beta_2 \ln(x_2) + \dots + \beta_n \ln(x_n)$
- При изменении  $x_j$  на 1 %,  $y$  меняется на  $\beta_j$  %

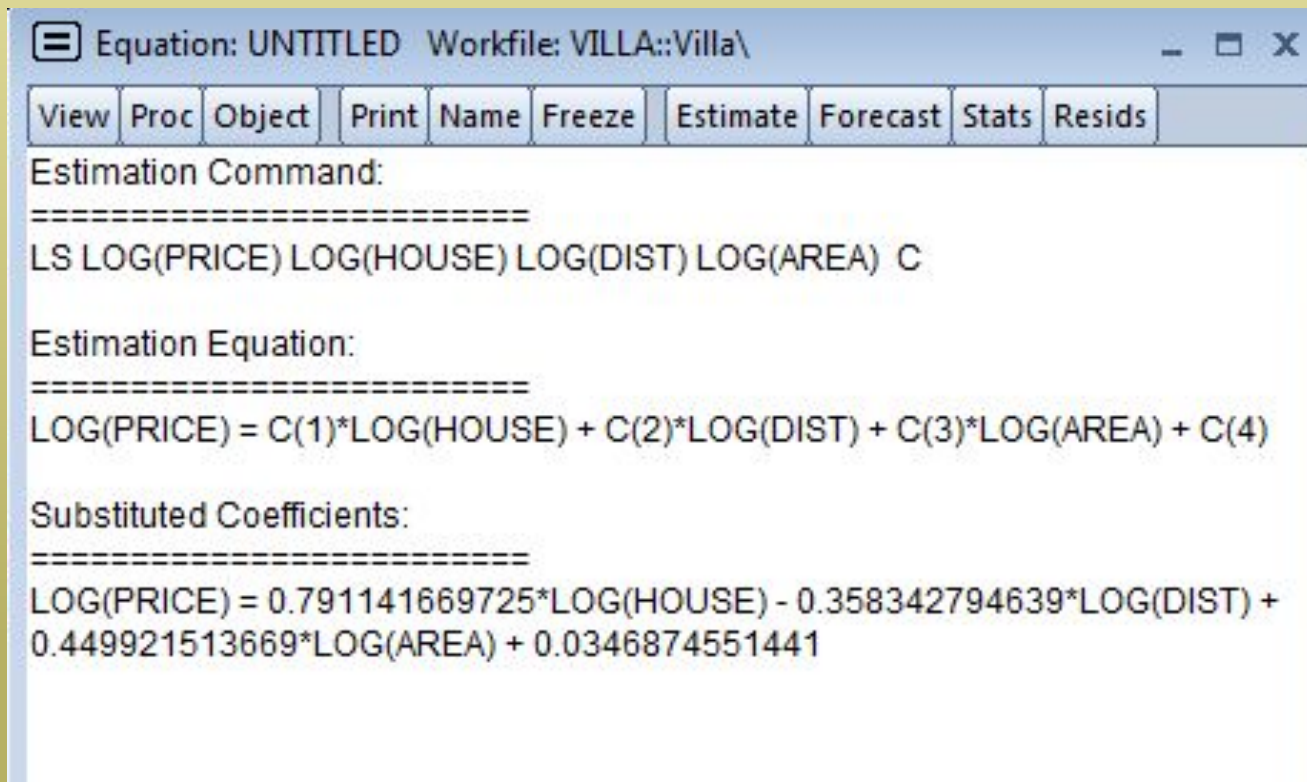


```
Equation: UNTITLED Workfile: VILLA::Villa\
View Proc Object Print Name Freeze Estimate Forecast Stats Resids
Estimation Command:
=====
LS LOG(PRICE) LOG(HOUSE) LOG(DIST) LOG(AREA) C
Estimation Equation:
=====
LOG(PRICE) = C(1)*LOG(HOUSE) + C(2)*LOG(DIST) + C(3)*LOG(AREA) + C(4)
Substituted Coefficients:
=====
LOG(PRICE) = 0.791141669725*LOG(HOUSE) - 0.358342794639*LOG(DIST) +
0.449921513669*LOG(AREA) + 0.0346874551441
```

## 4. Логарифмическая модель.

### Интерпретация [2]

- house – при увеличении площади дома на 1 % цена увеличивается на 0.79 %
- dist – при увеличении расстояния на 1 % цена уменьшается на 0.36 %
- area – при увеличении площади участка на 1 % цена увеличится на 0.45 %



```
Equation: UNTITLED  Workfile: VILLA::Villa\
View Proc Object Print Name Freeze Estimate Forecast Stats Resids
Estimation Command:
=====
LS LOG(PRICE) LOG(HOUSE) LOG(DIST) LOG(AREA) C
Estimation Equation:
=====
LOG(PRICE) = C(1)*LOG(HOUSE) + C(2)*LOG(DIST) + C(3)*LOG(AREA) + C(4)
Substituted Coefficients:
=====
LOG(PRICE) = 0.791141669725*LOG(HOUSE) - 0.358342794639*LOG(DIST) +
0.449921513669*LOG(AREA) + 0.0346874551441
```



# Проверка логарифмической модели на гетероскедастичность [1]

The screenshot displays the EViews software interface. The main window shows a workfile named 'VILLA' with 50 observations. A regression equation is estimated, and the 'Residual Diagnostics' menu is open, highlighting 'Heteroskedasticity Tests...'. The regression results are as follows:

Variable	Std. Error	t-Statistic	Prob.
0.117151	6.753190	0.0000	
0.098157	-3.650692	0.0007	

Additional regression statistics shown at the bottom of the window:

S.E. of regression	0.499184
Sum squared resid	11.46294
Log likelihood	-34.12433
F-statistic	70.58799
Prob(F-statistic)	0.000000
Durbin-Watson stat	1.776973

The status bar at the bottom indicates the path: Path = c:\users\наталья поповская\documents DB = none WF = villa

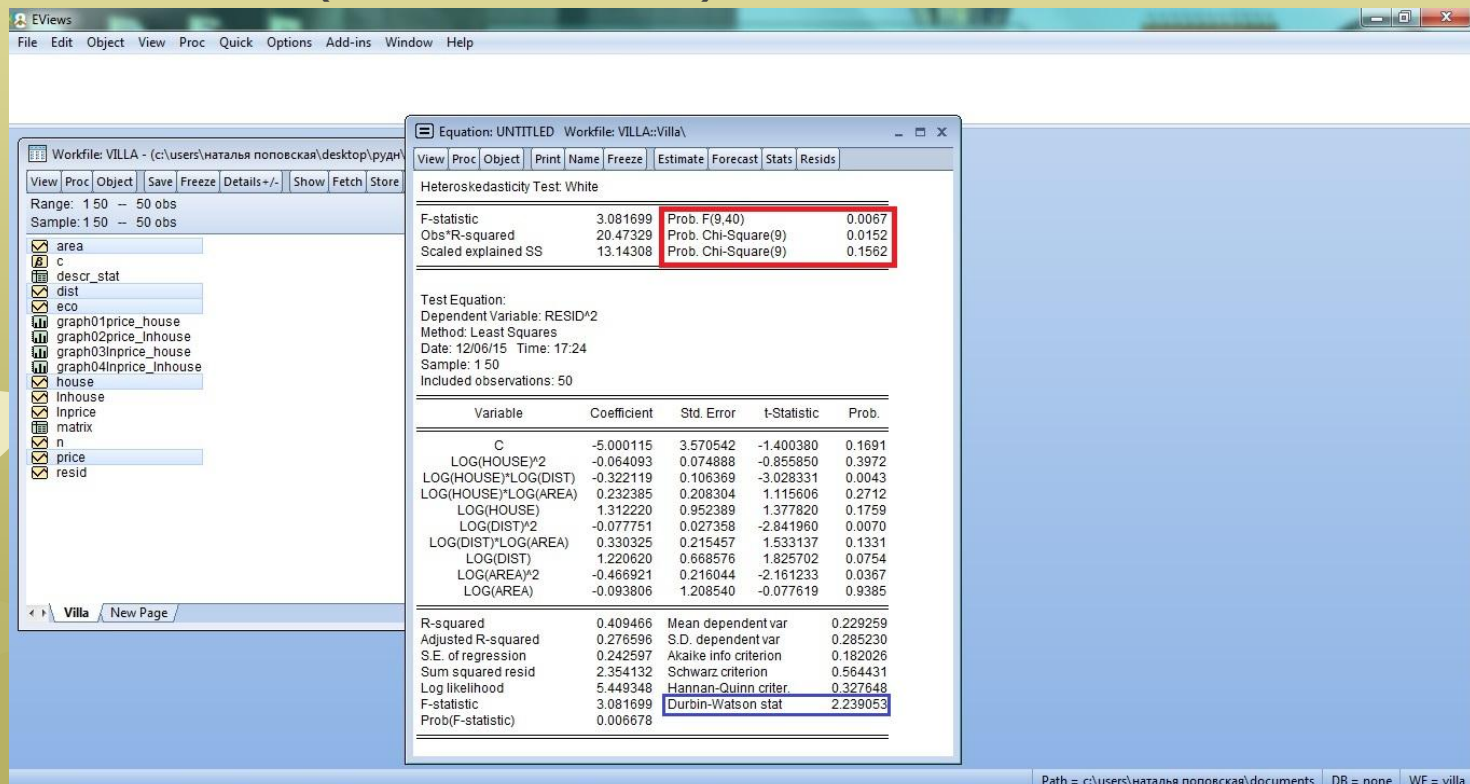
# Проверка логарифмической модели на гетероскедастичность [2]

- Выбираем проверку по White.

The screenshot displays the EViews software interface. The main window shows a workfile named 'VILLA' with a range of 150 to 50 observations. A list of objects is visible on the left, including 'area', 'c', 'descr\_stat', 'dist', 'eco', 'graph01price\_house', 'graph02price\_inhouse', 'graph03lnprice\_house', 'graph04lnprice\_inhouse', 'house', 'lnhouse', 'lnprice', 'matrix', 'n', 'price', and 'resid'. A dialog box titled 'Heteroskedasticity Tests' is open, showing the 'Specification' tab. The 'Test type' list includes Breusch-Pagan-Godfrey, Harvey, Glejser, ARCH, White, and Custom Test Wizard... The 'White' test is selected. The dependent variable is 'RESID^2'. The description states: 'The White Test regresses the squared residuals on the cross product of the original regressors and a constant.' The 'Include White cross terms' checkbox is checked. The 'OK' and 'Cancel' buttons are visible at the bottom of the dialog box. The status bar at the bottom of the EViews window shows 'Path = c:\users\наталья поповская\documents DB = none WF = villa'.

# Проверка логарифмической модели на гетероскедастичность [3]

- Гетероскедастичность – непостоянство дисперсии остатков
- $H_0$ : Остатки гомоскедастичны,  $\sigma^2 = \text{Const}$
- $H_1$ : Остатки гетероскедастичны  $\sigma^2 \neq \text{Const}$ .
- Присутствуют  $\text{Prob.} < 0.05$ , значит принимает гипотезу  $H_1$  (гетероскедастичность есть), смотрим коэффициент Durbin-Watson, сравниваем с 1.5 ( $2.239053 > 1.5$ )



# Подправка [1]

EViews Workfile: VILLA - (c:\users\наталья поповская\desktop\рунды\villa) Range: 1 50 -- 50 obs Sample: 1 50 -- 50 obs

Equation: UNTITLED Workfile: VILLA::Villa

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Hete Specify/Estimate...  
Forecast...  
F-st Make Residual Series... Prob. F(9,40) 0.0067  
Obs Prob. Chi-Square(9) 0.0152  
Scal Make Regressor Group Prob. Chi-Square(9) 0.1562  
Make Gradient Group  
Test Make Derivative Group  
Depi Make Model  
Meth Update Coefs from Equation  
Date  
Sam  
Inclu Add-ins

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.000115	3.570542	-1.400380	0.1691
LOG(HOUSE)*2	-0.064093	0.074888	-0.855850	0.3972
LOG(HOUSE)*LOG(DIST)	-0.322119	0.106369	-3.028331	0.0043
LOG(HOUSE)*LOG(AREA)	0.232385	0.208304	1.115606	0.2712
LOG(HOUSE)	1.312220	0.952389	1.377820	0.1759
LOG(DIST)*2	-0.077751	0.027358	-2.841960	0.0070
LOG(DIST)*LOG(AREA)	0.330325	0.215457	1.533137	0.1331
LOG(DIST)	1.220620	0.668576	1.825702	0.0754
LOG(AREA)*2	-0.466921	0.216044	-2.161233	0.0367
LOG(AREA)	-0.093806	1.208540	-0.077619	0.9385

R-squared 0.409466 Mean dependent var 0.229259  
Adjusted R-squared 0.276596 S.D. dependent var 0.285230  
S.E. of regression 0.242597 Akaike info criterion 0.182026  
Sum squared resid 2.354132 Schwarz criterion 0.564431  
Log likelihood 5.449348 Hannan-Quinn criter. 0.327648  
F-statistic 3.081699 Durbin-Watson stat 2.239053  
Prob(F-statistic) 0.006678

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Подправка [2]

The screenshot displays the EViews software interface. The main window shows a list of objects on the left, including 'area', 'c', 'descr\_stat', 'dist', 'eco', and several 'graph' objects. The 'Equation: UNTITLED' dialog box is open, showing the 'Equation Estimation' settings. The 'Specification' tab is active, and the 'Options' tab is also visible. The 'Coefficient covariance matrix' is set to 'Estimation default'. The 'ARMA options' section includes 'Starting coefficient values' set to 'OLS/TOLS' and 'Backcast MA terms' checked. The 'Iteration control' section shows 'Max Iterations' set to 500 and 'Convergence' set to 0.0001. The 'Derivatives' section has 'Accuracy' selected. The 'Coefficient name' is set to 'C'. Below the dialog box, a table of test statistics is visible:

Sum squared resid	2.354132	Schwarz criterion	0.564431
Log likelihood	5.449348	Hannan-Quinn criter.	0.327648
F-statistic	3.081699	Durbin-Watson stat	2.239053
Prob(F-statistic)	0.006678		

The status bar at the bottom indicates the path: Path = c:\users\наталья поповская\documents DB = none WF = villa

# Подправка [3]

- Т.к. коэффициент Durbin-Watson  $> 1.5$ , то берем подправку по White, в ином случае ( $D-W < 1.5$ ) – Newey-West.

The screenshot shows the EViews software interface. The main window displays a list of objects in the left pane, including 'area', 'c', 'descr\_stat', 'dist', 'eco', 'graph01price\_house', 'graph02price\_inhouse', 'graph03Inprice\_house', 'graph04Inprice\_inhouse', 'house', 'Inhouse', 'Inprice', 'matrix', 'n', 'price', and 'resid'. The main area shows the 'Equation: UNTITLED' window with the 'Heteroskedasticity Test: White' dialog box open. The dialog box has two tabs: 'Specification' and 'Options'. In the 'Specification' tab, the 'Coefficient covariance matrix' section has 'White' selected. The 'Options' tab shows 'ARMA options' with 'Starting coefficient values' set to 'OLS/TSLS' and 'Backcast MA terms' checked. The 'Iteration control' section shows 'Max Iterations' set to 500 and 'Convergence' set to 0.0001. The 'Derivatives' section has 'Accuracy' selected. The 'Coefficient name' field contains 'C'. At the bottom of the dialog box, there are 'OK' and 'Отмена' buttons. Below the dialog box, a table of statistics is visible:

Sum squared resid	2.354132	Schwarz criterion	0.564431
Log likelihood	5.449348	Hannan-Quinn criter.	0.327648
F-statistic	3.081699	Durbin-Watson stat	2.239053
Prob(F-statistic)	0.006678		

The status bar at the bottom of the EViews window shows the path 'Path = c:\users\natalya popovskaya\documents', 'DB = none', and 'WF = villa'.

# Подправка [4]

- Probability  $\log(\text{area})$  и  $\log(\text{dist})$  стали ближе к нулю, то есть стали лучше значимости коэффициентов.

Equation: UNTITLED Workfile: VILLA::Villa\

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: LOG(PRICE)  
Method: Least Squares  
Date: 12/06/15 Time: 17:26  
Sample: 1 50  
Included observations: 50  
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(HOUSE)	0.791142	0.106319	7.441175	0.0000
LOG(DIST)	-0.358343	0.072538	-4.940050	0.0000
LOG(AREA)	0.449922	0.156931	2.866997	0.0062
C	0.034687	0.522830	0.066346	0.9474

R-squared 0.821542 Mean dependent var 3.784721  
Adjusted R-squared 0.809904 S.D. dependent var 1.144939  
S.E. of regression 0.499194 Akaike info criterion 1.524973  
Sum squared resid 11.46294 Schwarz criterion 1.677935  
Log likelihood -34.12433 Hannan-Quinn criter. 1.583222  
F-statistic 70.58799 Durbin-Watson stat 1.776973  
Prob(F-statistic) 0.000000 Wald F-statistic 75.76347  
Prob(Wald F-statistic) 0.000000

Path = c:\users\наталья поповская\documents DB = none WF = villa

# Проверка на нормальность[1]

The screenshot shows the EViews software interface. The main window displays a regression equation titled "Equation: UNTITLED" in the "Workfile: VILLA::Villa\". The "View" menu is open, and the "Residual Diagnostics" option is selected, which has opened a sub-menu. In this sub-menu, the "Histogram - Normality Test" option is highlighted. The main window also shows a list of objects on the left, including "area", "c", "descr\_stat", "dist", "eco", and several "graph" objects related to "price\_house" and "price\_inhouse".

Label			
Adjusted R-squared	0.609904		
S.E. of regression	0.499194		
Sum squared resid	11.46294		
Log likelihood	-34.12433	Hannan-Quinn criter.	1.583222
F-statistic	70.58799	Durbin-Watson stat	1.776973
Prob(F-statistic)	0.000000	Wald F-statistic	75.76347
Prob(Wald F-statistic)	0.000000		

Path = c:\users\наталья поповская\documents DB = none WF = villa



# Проверка на нормальность[2]

- $H_0$ : нормальное распределение
- $H_1$ : ненормальное распределение ( $\text{Prob} < 0.05$ )
- $\text{Probability} > 0.05 \rightarrow$  распределение нормальное, Skewness близок к нулю, что хорошо.

