
Quantitative methods for economics, finance and management

2019/2020



LAB 1 (2/2)

23.09.2019



Lab-1: Descriptive Statistics

Group: UNTITLED Workfile: CASTDATACLASS_V1::tim

View	Proc	Object	Print	Name	Freeze	Sample	Sheet	Stats	S
				BRENT_SP...		RAC			
1→	2→			Mean		45.59263	40.00228		
				Median		29.24000	27.59000		
				Maximum		135.5400	127.7700		
				Minimum		9.780000	9.390000		
3→	4}			Std. Dev.		33.21287	28.95885		
				Skewness		0.947297	1.153514		
				Kurtosis		2.622340	3.121792		
				Jarque-Bera		57.84773	94.51317		
				Probability		0.000000	0.000000		
				Sum		16960.46	17000.97		
				Sum Sq. Dev.		409248.2	355572.7		
				Observations		372	425		

• DESCRIPTIVE STATISTICS ABOUT 2 VARIABLES :

1) THE BRENT SPOT PRICE

2) THE RAC

1) MEAN (SAMPLE MEAN) IS THE SUM OF OBSERVATIONS DIVIDED BY THE NUMBER OF OBSERVATIONS

$$\bar{X} = (X_1 + X_2 + X_3 + \dots + X_t + X_{t+1} + \dots + X_T) / T$$

$$= \frac{1}{T} \cdot \sum_{t=1}^T X_t$$

Lab-1: Descriptive Statistics

• COMMENT: $\sum_{t=1}^T (X_t - \bar{X}) = 0$

$$\sum_{t=1}^T X_t - \sum_{t=1}^T \bar{X} = 0$$

$\rightarrow T\bar{X}$

SINCE $\bar{X} = \frac{1}{T} \sum_{t=1}^T X_t$ WE HAVE THAT:

$$T\bar{X} = \frac{1}{T} \sum_{t=1}^T X_t \cdot T \Rightarrow T\bar{X} = \sum_{t=1}^T X_t$$

FINALLY, $T\bar{X} - T\bar{X} = 0$

Lab-1: Descriptive Statistics

2) MEDIAN

- THE MEDIAN IN A SAMPLE OF NUMBERS IS THE MIDDLE VALUE AFTER THE NUMBERS HAVE BEEN ORDERED
- IN A PROBABILITY DISTRIBUTION IS THE VALUE WHERE THERE IS 50% CHANCE OF BEING BELOW THE VALUE AND 50% OF BEING ABOVE
- TO COMPUTE THE MEDIAN, WE HAVE 2 STEPS:
 - 1) SORT OUT THE OBSERVATIONS $X_1 \leq X_2 \leq X_3 \dots \leq X_T$

Lab-1: Descriptive Statistics

$$2) \text{Med}(X) \begin{cases} X_{(\frac{T+1}{2})} & \text{IF } T \text{ IS ODD NUMBER} \\ \frac{1}{2} [X_{(T/2)} + X_{(T/2+1)}] & \text{OTHERWISE} \end{cases}$$

- MEASURE OF SPREAD

THE VARIANCE MEASURES HOW FAR A DATA IS SPREAD OUT. IN OTHER WORDS, IT MEASURES THE DISPERSION OF THE DATA FROM THE MEAN

Lab-1: Descriptive Statistics

- VARIANCE (IN ECONOMICS MEANS RISK!)

$$\sigma_x^2 = \text{Var}(X) = \frac{1}{N-1} \left[(X_1 - \bar{X})^2 + (X_2 - \bar{X})^2 + \dots + (X_n - \bar{X})^2 + \dots + (X_N - \bar{X})^2 \right]$$
$$= \frac{1}{N-1} \sum_{i=1}^N (X_i - \bar{X})^2 \quad \text{WHERE } \bar{X} = \frac{1}{N} \sum_{i=1}^N X_i$$

- STANDARD DEVIATION (SD) IS THE SQUARE ROOT OF THE VARIANCE AND IT INDICATES HOW CLOSE THE DATA IS TO THE MEAN

$$Sd(X) = \sqrt{\text{Var}(X)} = \sqrt{\sigma_x^2} = \sigma_x = \sqrt{\frac{1}{N-1} \sum_{i=1}^N (X_i - \bar{X})^2} \quad \text{WHERE } \bar{X} \text{ IS THE SAMPLE MEAN}$$

Lab-1: Descriptive Statistics

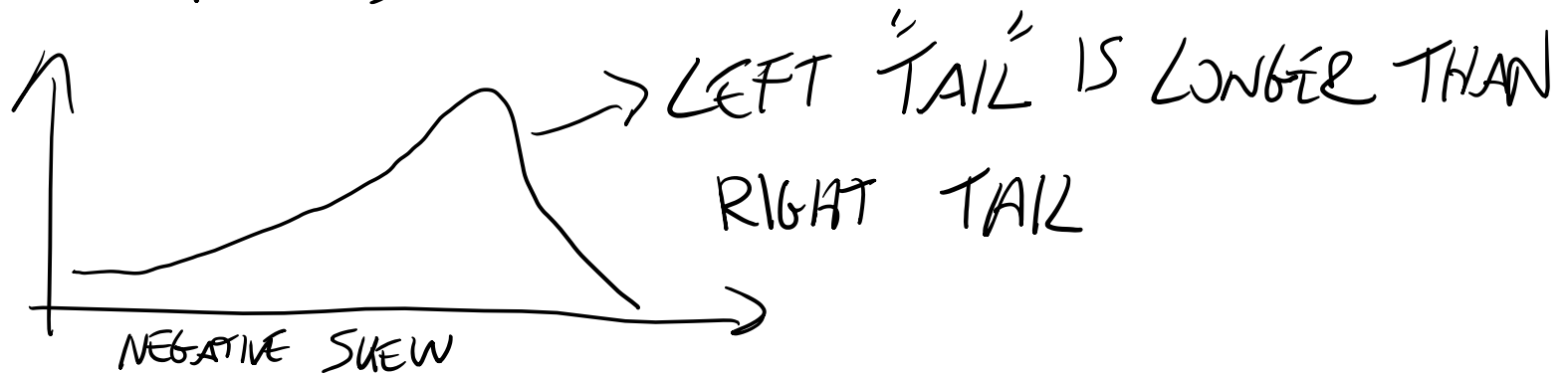
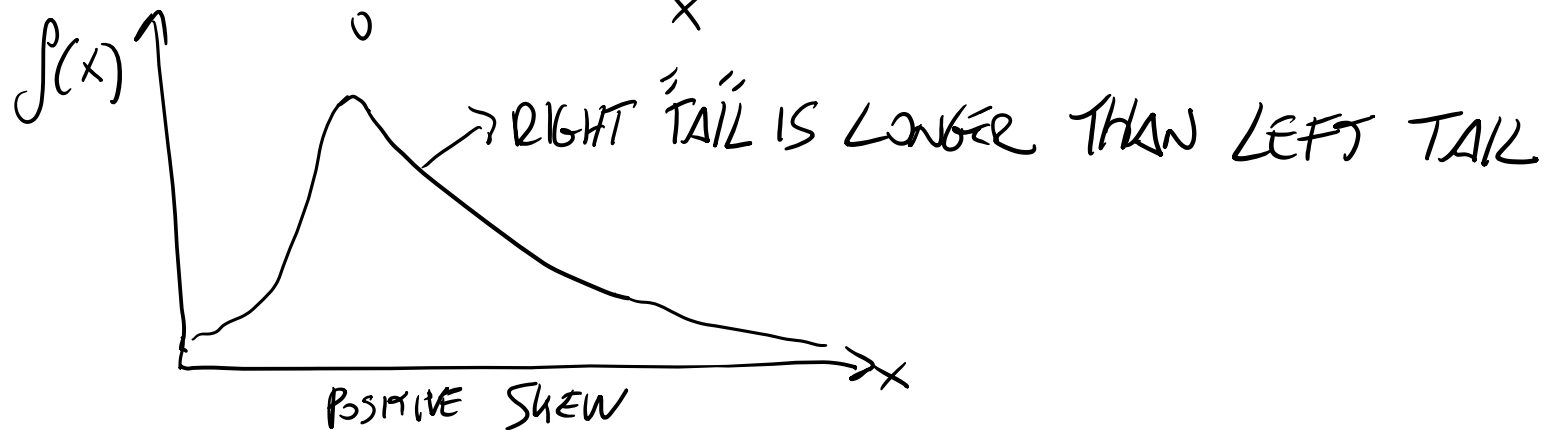
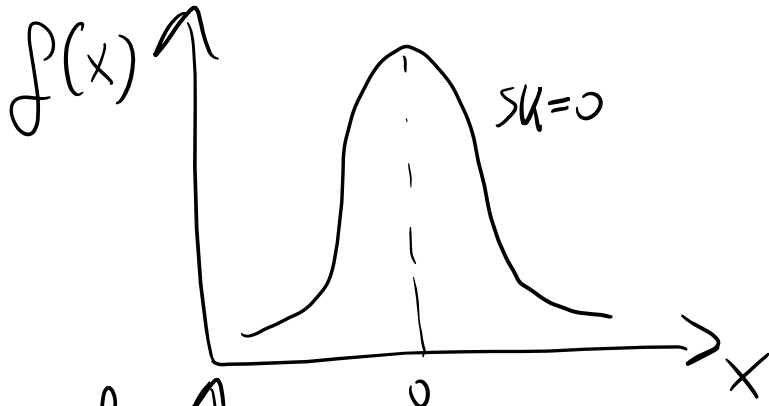
- THE SKEWNESS MEASURES THE DEGREE OF ASYMMETRY OF THE DISTRIBUTION OF THE SERIES

S_K { = 0 , THE DISTRIBUTION IS SYMMETRIC AROUND THE MEAN
 > 0 , IT INDICATES A SKEW TO THE LEFT
 < 0 , " = RIGHT

$$S_k = \frac{\sum_{t=1}^T (X_t - \bar{X})^3}{(T-1) \cdot S^3}$$

WHERE $S = \underset{\downarrow}{S_d(X)}$
STANDARD DEVIATION

Lab-1: Descriptive Statistics



Supporting materials

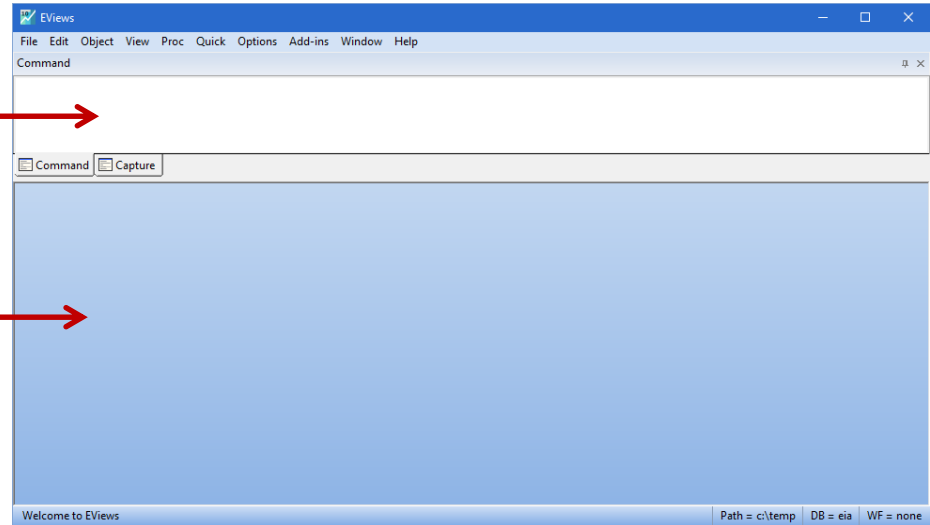
What is EViews?

- EViews is an easy-to-use statistical, econometric, and economic modeling package.
- There are three ways to work in EViews:
 1. Graphical user interface (using mouse and menus/dialogs).
 2. Single commands (using the command window).
 3. Program files (commands assembled in a script executed in batch mode).

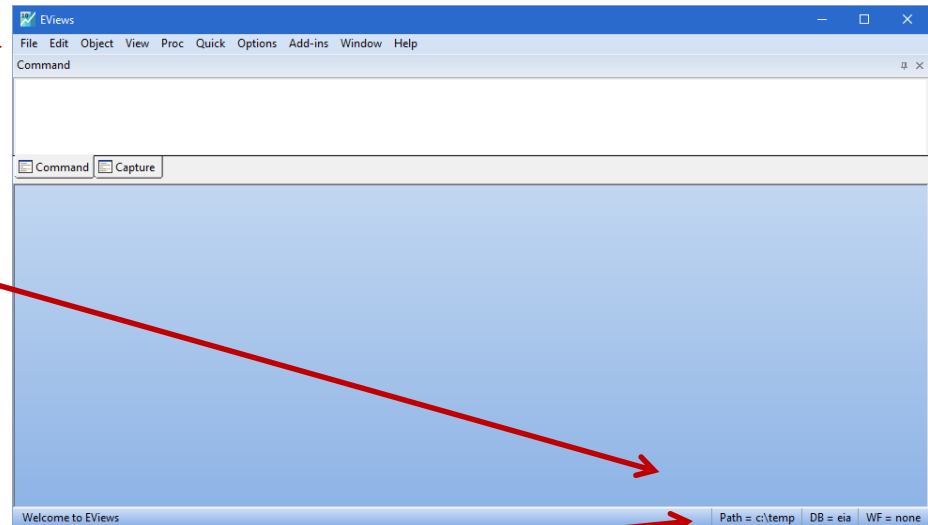
EViews Desktop

**Command
Window**

**Object
Window/
Work Area**



Main Menu



Note: Path/Database/Workfile
can be changed by double-clicking in each.

Path/directory

Database

Workfile

Import cross-section data from xls

Excel Read - Step 1 of 3

Cell Range

☒ Predefined range Sheet: **cross_section1**

cross_section1

Start cell: **\$A\$1**

☐ Custom range

cross_section1!\$A\$1:\$C\$41

End cell: **\$C\$41**

Country Names	consumption	income
Afghanistan	9.46	25.83
Albania	10.56	34.31
Algeria	14.81	42.5
American Samoa	21.71	46.75
Andorra	22.79	48.29
Angola	18.19	48.77
Anguilla	22	49.65
Antigua & Barbuda	18.12	51.94
Argentina	23.13	54.33
Armenia	19	54.87

☐ Read series by row (transpose incoming data)

Annulla < Indietro Avanti > Fine

Excel Read - Step 2 of 3

Column headers

Header lines: **1**

Header type: **Names only**

Clear Edited Column Info

Column info

Click in preview to select column for editing

Name: **Country Names**

Description:

Data type: **Character**

Text representing NA

#N/A

Country Names	consumption	income
Afghanistan	9.46	25.83
Albania	10.56	34.31
Algeria	14.81	42.5
American Samoa	21.71	46.75
Andorra	22.79	48.29
Angola	18.19	48.77
Anguilla	22	49.65
Antigua & Barbuda	18.12	51.94
Argentina	23.13	54.33

☐ Read series by row (transpose incoming data)

Annulla < Indietro Avanti > Fine

Excel Read - Step 3 of 3

Import method

Create new workfile

Import options

Rename Series

Frequency Conversion

Structure of the Data to be Imported

Basic structure

Undated with ID series

Unstructured / Undated

Dated - regular frequency

Dated - specified by date series

Dated Panel

Undated with ID series

Undated Panel

	COUNTRY_NAMES	CONSUMPTION	INCOME
1	Afghanistan	9.46	25.83
2	Albania	10.56	34.31
3	Algeria	14.81	42.50
4	American Samoa	21.71	46.75
5	Andorra	22.79	48.29
6	Angola	18.19	48.77
7	Anguilla	22.00	49.65
8	Antigua & Barbuda	18.12	51.94
9	Argentina	23.13	54.33
10	Armenia	19.00	54.87
11			

Cancel <Back Next> Finish

Import time-series data from xls

Excel Read - Step 1 of 3

Cell Range

☒ Predefined range
 times_series1

Sheet: times_series1
 Start cell: \$A\$1
 End cell: \$K\$426

☐ Custom range
 times_series1!\$A\$1:\$K\$426

Month	CPI	prod	WIP	REA	WTI spot price	RAC	Brent
1983-01-01	97.9	52762.757	47.39715	-17.648634	28.25	31.4	
1983-02-01	98	49812.05	47.12232	-12.779254	29.6	30.76	
1983-03-01	98.1	50735.958	47.46125	-9.8951757	30.3	28.43	
1983-04-01	98.8	50958.936	47.79528	-7.2121672	31.35	27.95	
1983-05-01	99.2	52658.767	47.95616	-7.4237452	31.95	28.53	
1983-06-01	99.4	52868.746	48.25271	-22.366511	31.65	29.23	
1983-07-01	99.8	54651.57	48.3844	-33.627313	31.95	28.76	
1983-08-01	100.1	54498.585	48.8524	-34.676906	31.65	29.5	
1983-09-01	100.4	55152.519	49.35585	-31.665354	30.45	29.54	

☐ Read series by row (transpose incoming data)

Annulla < Indietro Avanti > Fine

Excel Read - Step 2 of 3

Column headers

Header lines: 1
 Header type: Names only
 Clear Edited Column Info

Text representing NA
 #N/A

Column info
 Click in preview to select column for editing
 Name: Month
 Description:
 Data type: Date

Month	CPI	prod	WIP	REA	WTI spot price	RAC	Brent
1983-01-01	97.9	52762.757	47.39715	-17.648634	28.25	31.4	
1983-02-01	98	49812.05	47.12232	-12.779254	29.6	30.76	
1983-03-01	98.1	50735.958	47.46125	-9.8951757	30.3	28.43	
1983-04-01	98.8	50958.936	47.79528	-7.2121672	31.35	27.95	
1983-05-01	99.2	52658.767	47.95616	-7.4237452	31.95	28.53	
1983-06-01	99.4	52868.746	48.25271	-22.366511	31.65	29.23	
1983-07-01	99.8	54651.57	48.3844	-33.627313	31.95	28.76	
1983-08-01	100.1	54498.585	48.8524	-34.676906	31.65	29.5	

☐ Read series by row (transpose incoming data)

Annulla < Indietro Avanti > Fine

Excel Read - Step 3 of 3

Import method
 Create new page

Import options
 Rename Series
 Frequency Conversion

Structure of the Data to be Imported

Basic structure
 Dated - specified by date series
 Unstructured / Undated
 Dated - regular frequency
 Dated - specified by date series
 Dated Panel
 Undated with ID series
 Undated Panel

Frequency: Monthly

	MONTH	CPI	PROD	WIP	REA	WTI_SPOT
1	1983M01	97.900	52762.757	47.39715	-17.64863	
2	1983M02	98.000	49812.050	47.12232	-12.77925	
3	1983M03	98.100	50735.958	47.46125	-9.895176	
4	1983M04	98.800	50958.936	47.79528	-7.212167	
5	1983M05	99.200	52658.767	47.95616	-7.423745	
6	1983M06	99.400	52868.746	48.25271	-22.36651	
7	1983M07	99.800	54651.570	48.38440	-33.62731	
8	1983M08	100.100	54498.585	48.85240	-34.67691	
9	1983M09	100.400	55152.519	49.35585	-31.66535	

Cancel < Back Next > Finish

Import panel data from xls

Excel Read - Step 1 of 3

Cell Range

☒ Predefined range
 Sheet: panel_data1
 Start cell: \$A\$1
 End cell: \$F\$71

☐ Custom range
 panel_data1!\$A\$1:\$F\$71

country	year	y	x1	x2	x3
Afghanistan	1990	1343000000	0.2779036	-1.107956	0.2825536
Afghanistan	1991	-1900000000	0.3206847	-0.94872	0.4925385
Afghanistan	1992	-11234363	0.3634657	-0.789484	0.7025234
Afghanistan	1993	2646000000	0.246144	-0.885533	-0.0943909
Afghanistan	1994	3008000000	0.424623	-0.7297683	0.9461306
Afghanistan	1995	3230000000	0.4772141	-0.723246	1.02968
Afghanistan	1996	2757000000	0.499805	-0.7815716	1.092288
Afghanistan	1997	2772000000	0.0516284	-0.7048455	1.415901
Afghanistan	1998	3397000000	0.3664108	-0.6983712	1.548723
Afghanistan	1999	39770336	0.3958425	-0.643154	1.794198

☐ Read series by row (transpose incoming data)

Annulla < Indietro Avanti > Fine

Excel Read - Step 2 of 3

Column headers

Header lines: 1
 Header type: Names only
 Clear Edited Column Info

Text representing NA
 #N/A

Column info
 Click in preview to select column for editing
 Name: year
 Description:
 Data type: Number
 Character
 Number
 Date

country	year	y	x1	x2	x3
Afghanistan	1990	1343000000	0.2779036	-1.107956	0.2825536
Afghanistan	1991	-1900000000	0.3206847	-0.94872	0.4925385
Afghanistan	1992	-11234363	0.3634657	-0.789484	0.7025234
Afghanistan	1993	2646000000	0.246144	-0.885533	-0.0943909
Afghanistan	1994	3008000000	0.424623	-0.7297683	0.9461306
Afghanistan	1995	3230000000	0.4772141	-0.723246	1.02968
Afghanistan	1996	2757000000	0.499805	-0.7815716	1.092288
Afghanistan	1997	2772000000	0.0516284	-0.7048455	1.415901
Afghanistan	1998	3397000000	0.3664108	-0.6983712	1.548723

☐ Read series by row (transpose incoming data)

Annulla < Indietro Avanti > Fine

Excel Read - Step 3 of 3

Import method
 Create new page

Basic structure
 Dated Panel
 Frequency: Annual

Import options
 Rename Series
 Frequency Conversion

Panel identifier series
 Cross section ID series: country
 Date series: year

	COUNTRY	YEAR	Y	X1	X2	X3
1	Afghanistan	1990	1.34E+09	0.277904	-1.107956	
2	Afghanistan	1991	-1.90E+09	0.320685	-0.948720	
3	Afghanistan	1992	-11234363	0.363466	-0.789484	
4	Afghanistan	1993	2.65E+09	0.246144	-0.885533	
5	Afghanistan	1994	3.01E+09	0.424623	-0.729768	
6	Afghanistan	1995	3.23E+09	0.477214	-0.723246	
7	Afghanistan	1996	2.76E+09	0.499805	-0.781572	
8	Afghanistan	1997	2.77E+09	0.051628	-0.704846	
9	Afghanistan	1998	3.40E+09	0.366411	-0.698371	
10						
11						

Cancel < Back Next > Finish

Output EViews (time series and cross-section data)

EViews - [Group: UNTITLED] Workfile: LESSON1EVIEWWS24092018::ti...

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

View	Proc	Object	Print	Name	Freeze	Sample	Sheet	Stats	Spec
		BRENT_SP...		RAC					
Mean		45.59263		40.00228					
Median		29.24000		27.59000					
Maximum		135.5400		127.7700					
Minimum		9.780000		9.390000					
Std. Dev.		33.21287		28.95885					
Skewness		0.947297		1.153514					
Kurtosis		2.622340		3.121792					
Jarque-Bera		57.84773		94.51317					
Probability		0.000000		0.000000					
Sum		16960.46		17000.97					
Sum Sq. Dev.		409248.2		355572.7					
Observations		372		425					

Path = g:\castellanza_v1\prova DB = none WF = lesson1reviews24092018

G Group: CONFINCO Workfile: LESSON1EVIEWWS24092018::cross_section1\

View	Proc	Object	Print	Name	Freeze	Sample	Sheet	Stats	Spec
		CONSUMPT...		INCOME					
Mean		23.59450		69.80000					
Median		21.85500		71.23000					
Maximum		48.71000		115.4600					
Minimum		9.460000		25.83000					
Std. Dev.		8.176025		19.82269					
Skewness		1.034804		0.218662					
Kurtosis		4.129972		2.985860					
Jarque-Bera		9.266858		0.319087					
Probability		0.009721		0.852533					
Sum		943.7800		2792.000					
Sum Sq. Dev.		2607.048		15324.63					
Observations		40		40					

Histogram in EViews

