



PrimaXL V2017 Quick Start Guide



FIAN RESEARCH

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Introductory Remarks

This is the User's Reference Manual of PrimaXL add-in which is a software that extends Microsoft Excel with new features.

PrimaXL was developed with the purpose of extending the capabilities of MS Excel in data mining and time series¹ analysis.

PrimaXL was developed for use by beginners as well as experts. The easiest way to execute the PrimaXL functions is through the intuitive ribbon menu. If necessary, the user may directly type the functions in the spreadsheet cells or may invoke the functions from a VBA script.

This Quick Start Guide is intended to guide you through the installation process and to provide an overview of the PrimaXL's ribbon menu and functions. Please, refer to the User's Reference Manual for more in-depth information on the functions.

¹ Financial asset prices and returns are representative examples of time series.

1. Installing PrimaXL

1.1 System Requirements and Installation

PrimaXL is an add-in software that resides within Microsoft Excel. Before you install it, you need to have a working version of Microsoft Excel on your PC. The requirements are following:

1. PC running Windows² 7 or later version.
2. Microsoft Excel 2007 or later version (32 bit or 64 bit).
3. Microsoft .NET Framework 4.0 or later version.
4. Internet connection in order to validate the license key.

Please, notice that in case your PC does not yet have Microsoft .NET Framework installed, the PrimaXL installer will guide you through its installation first. Microsoft .NET Framework is maintained and supported by Microsoft. Its latest versions are freely available from www.microsoft.com/en-us/download/.



Figure 1.1

After verifying the compliance with the requirements, you can install PrimaXL add-in by executing *PrimaXL installer* located in the main folder. Please, close all Excel windows before starting the installation process. Figure 1.1 shows the initial message box asking to confirm the installation.

PrimaXL is composed of two modules: the XLL module that contains the functions

² Apologies to the macOS users.

and the COM module that displays the ribbon menu. You are first guided through the installation of the XLL module. Please, use the default installation folder unless you have other compelling reasons to change it.

Then, you have to agree with the End User License Agreement (EULA) in order to continue (see [Figure 1.2](#)).



[Figure 1.2](#)

Next, you are taken to the installation of the COM module. You will feel like you are going through a similar installation process all over again. That is OK. Please, just follow the instructions.

After the installation is over, start Excel and you can see that there is a new menu tab named **PrimaXL**. You can click on it to access the program's ribbon menu ([Figure 1.3](#)).

1.2 Installing the License

As soon as you complete the basic installation process, PrimaXL is still in the trial mode. In the trial mode, only a small number of functions are enabled. A disabled function³ will always return value 0 when typed directly into the spreadsheet. Also, you can see that several items of the ribbon menu remain disabled ([Figure 1.3](#)).

³ The disabled functions correspond to the disabled features of the ribbon menu.

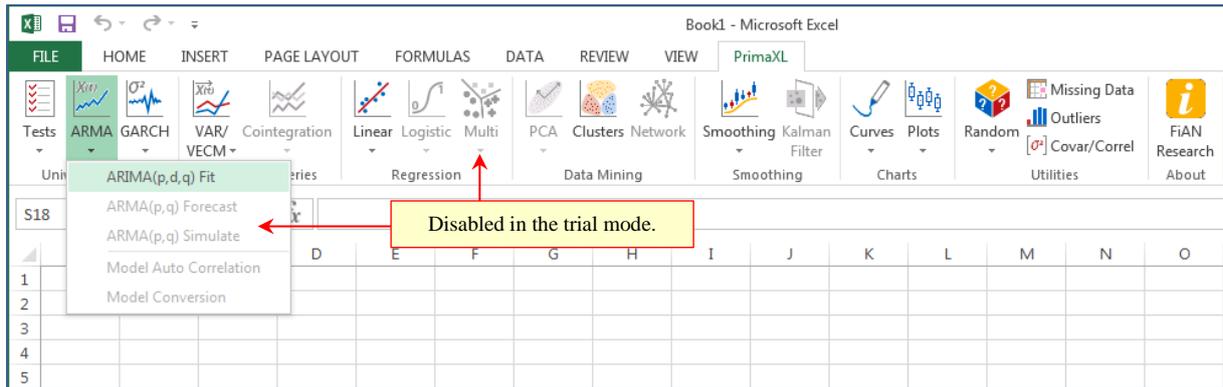


Figure 1.3

In order to gain a full access to the PrimaXL add-in, you need to install the license⁴. Please, click on the  button and enter the license key that you purchased. Then, press on the **Validate** button. During the validation process, your PC must be connected to the internet.

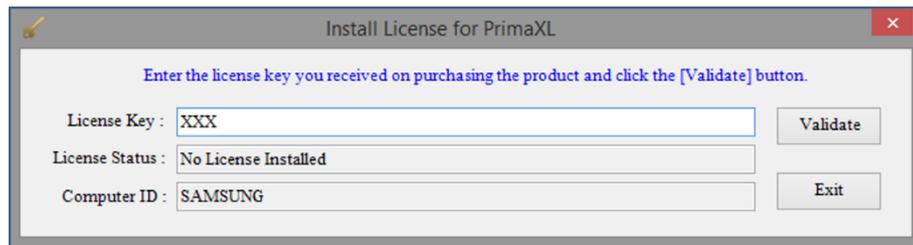


Figure 1.4

After installing the license, press **Exit**. Now you can see that all of the menu items are enabled (Figure 1.5).

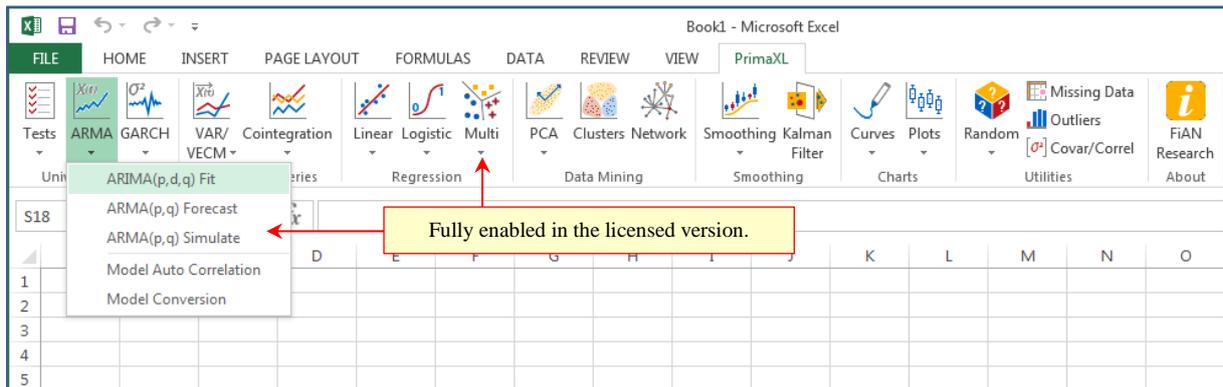


Figure 1.5

⁴ You can install the license by validating a license key.

Now, when you click on the  button, you will see the following message box (Figure 1.6) instead of Figure 1.4.



Figure 1.6

1.3 Uninstalling the Program

In order to safely remove the PrimaXL components, go to the Windows Control Panel and click on *Uninstall a program*. Then, separately double click on *PrimaXL ribbon menu* and *PrimaXL functions* (Figure 1.7).

 PrimaXL ribbon menu	FIAN Research	2017-02-12	9.53MB	1.0.0
 PrimaXL functions	FIAN Research	2017-02-12	4.92MB	1.0.0

Figure 1.7

The uninstall process only removes the add-in components while leaving the previously validated license in the PC. In the future when a free upgrade becomes available you will be able to uninstall the old version and then install the new version without having to validate the license key again. However, this also implies that your license is bound to a specific PC hardware and that you will not be able to transfer it from one machine to another.

2. Using PrimaXL

2.1 Overview

The PrimaXL functions can be applied in three different ways:

- 1) **From PrimaXL ribbon menu:** This is the easiest way to access the PrimaXL functions. Select the desired task and complete the menu form. You don't have to worry about the syntax. "No typing... just select and click!"
- 2) **By typing the functions manually into the spreadsheet cell(s):** In this case, the user should make sure to follow the correct syntax.
- 3) **Call from a VBA script:** Use the VBA method *Application.Run*.

In the following sections, we will briefly explore the PrimaXL ribbon menu and see how easy it really is to use it.

2.2 PrimaXL Ribbon Menu

PrimaXL - V2017 ribbon menu looks like the figure below.

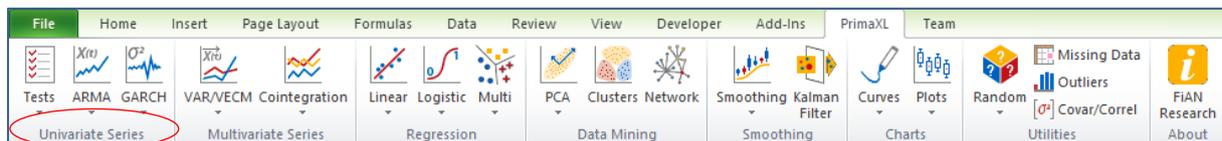


Figure 2.1

One thing we can notice is that the buttons are organized in groups. The details are as following:

1. GROUP : Univariate Series

1.1. Tests

- AR Characteristic Roots
- Auto Correlation

- Identify AR(p) Model
- Ljung-Box Test
- Unit Root Test

1.2. ARMA

- ARIMA(p,d,q) Fit
- ARMA(p,q) Forecast
- ARMA(p,q) Simulate
- Model Auto Correlation
- Model Conversion

1.3. GARCH

- GARCH(p,q) Fit
- GARCH(p,q) Forecast
- GARCH(p,q) Simulate

2. GROUP : Multivariate Series

2.1. VAR/VECM

- VAR(p) Fit
- VAR(p) Forecast
- VAR(p) Simulate
- VECM(p) Fit
- VECM(p) Forecast
- VECM(p) Simulate

2.2. Cointegration

- Detect
- Forecast

3. GROUP : Regression

3.1.  Linear

- Fit
- Forecast
- Test

3.2.  Logistic

- Fit
- Forecast
- Test

3.3.  Multi

- Fit
- Forecast
- Test

4. GROUP : Data Mining

4.1.  PCA

- Principal Component Analysis
- Dimension Reduction

4.2.  Clusters

4.3.  Network

5. GROUP : Smoothing

5.1.  Smoothing

- Exponential Smoothing Fit
- Exponential Smoothing Forecast
- Moving Averages

5.2.  Kalman Filter

6. GROUP : Charts

6.1.  Curves

- Fit Polynomial
- Fit Bezier
- Interpolate Linear
- Interpolate Polynomial
- Interpolate Cubic Spline

6.2.  Plots

- Box Plot
- Histogram
- QQ Plot

7. GROUP : Utilities

7.1.  Random

- Univariate Sampling
- Correlated Sampling

7.2.  Missing Data

7.3.  Outliers

7.4.  Covariance/Correlation

8. GROUP : About

8.1.  FIAN Research

2.3 Example

Let us illustrate the use of PrimaXL with an example. We will apply k -means clustering which is one of the most widely used unsupervised learning methods. It is simple and yet powerful. Quite often, it is part of what we call “exploratory analysis”, the first step in making sense of the raw data. In this method, each cluster is defined by a center around which the observations are gathered by proximity.

As seen in the next **Figure 2.2**, we go to the PrimaXL ribbon menu and then click on the **Clusters** button to bring up the menu form.

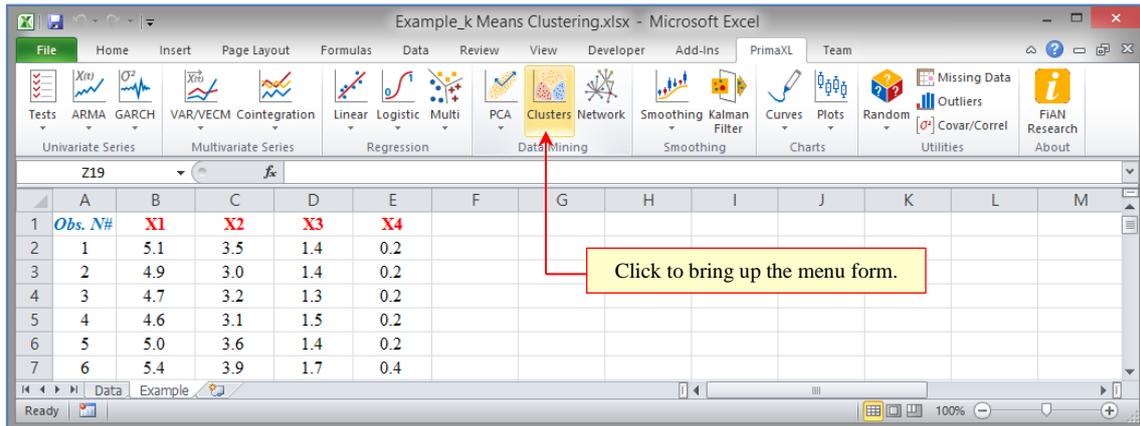


Figure 2.2

Then, a menu form shown in **Figure 2.3** appears. Please, notice that the menu form is organized in two big groups: **Input and Specification** and **Output**.

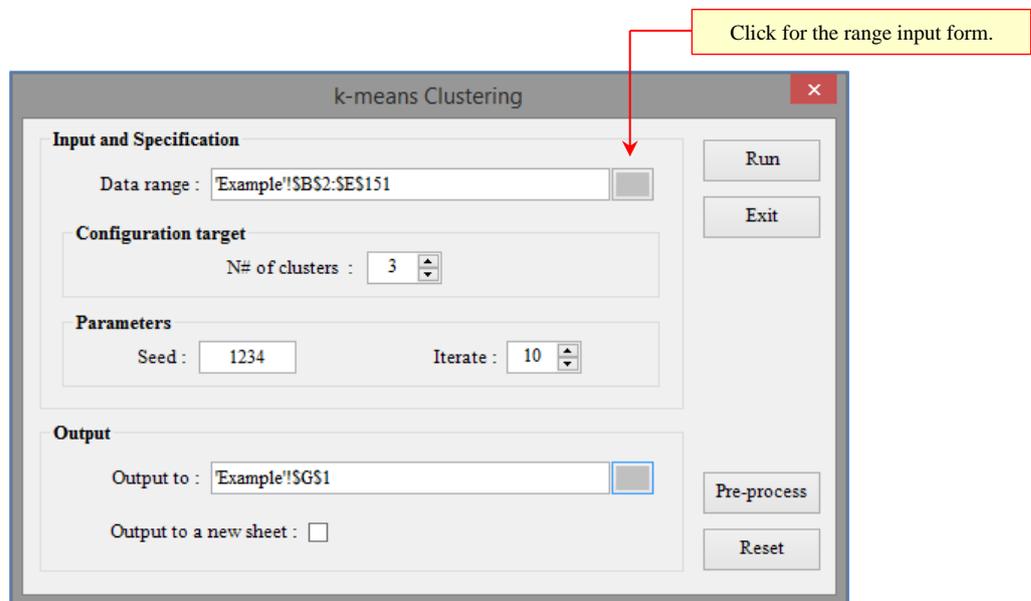


Figure 2.3

First, we have to complete the **Input and Specification** group. At the topmost field we should enter the *Data range*. We can either type directly in the blank field or press the small button on the right to invoke the range input form (Figure 2.4). This last method is the easier and preferable way of entering an error-free range value.

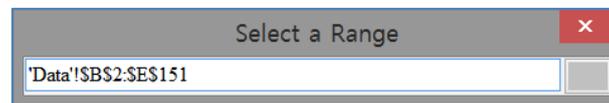


Figure 2.4: Press the button on the right to accept the input or click on the cancel button.

Then, we move down and specify the *N# of clusters*. The random number generator seed (*Seed*) and the iteration number (*Iterate*) are necessary for the iterative algorithm. These numbers have to be positive integers.

Finally, we proceed to the **Output** group. Here, we have to specify the location of the output (within an existing worksheet) or check the box *Output to a new sheet* in order to create a new worksheet and stream the output to it. When we are done filling out the menu form, we can press the **RUN** button to generate the result shown in Figure 2.5 and Figure 2.6.

CLUSTER ANALYSIS RESULT (target = 3 clusters)								
Obs. N#	X1	X2	X3	X4	Dist. 1	Dist. 2	Dist. 3	Cluster ID
1	5.1	3.5	1.4	0.2	0.141	5.060	3.419	0
2	4.9	3.0	1.4	0.2	0.448	5.115	3.399	0
3	4.7	3.2	1.3	0.2	0.417	5.279	3.569	0
4	4.6	3.1	1.5	0.2	0.525	5.154	3.422	0
5	5.0	3.6	1.4	0.2	0.189	5.104	3.467	0
6	5.4	3.9	1.7	0.4	0.677	4.681	3.147	0
7	4.6	3.4	1.4	0.3	0.415	5.211	3.517	0
8	5.0	3.4	1.5	0.2	0.066	5.003	3.337	0

Figure 2.5: The first few rows of the result output.

In this example⁵, we had targeted three clusters. Figure 2.5 shows a large Excel table with the clustering details. The last column of this table gives the *Cluster ID* of the observations⁶. Also, a summary is shown as part of the result output (Figure 2.6). We can see that the cluster sizes are 50, 38 and 62 each.

⁵ This example along with the data can be found in the workbook “*Example_k Means Clustering.xlsx*”.

⁶ A *Cluster ID* is an integer number equal or larger than 0.

<i>Cluster ID</i>	<i>X1</i>	<i>X2</i>	<i>X3</i>	<i>X4</i>
0	5.006	3.428	1.462	0.246
1	6.850	3.074	5.742	2.071
2	5.902	2.748	4.394	1.434
<i>Cluster ID</i>	<i>Population</i>			
0	50			
1	38			
2	62			

Figure 2.6

3. Summary of Functions

The PrimaXL functions can be summarized in the following table. Please, notice that the functions are grouped by the common purpose. The prefix “TS” is used in naming the time series functions.

FUNCTION NAME	PURPOSE
<i>AvgExp</i> <i>AvgRunning</i> <i>AvgWeighted</i> <i>AvgWeightedGeneral</i>	Calculate various types of moving averages.
<i>ClusterCenters</i>	Applies the Lloyd’s algorithm and calculates the cluster centers. k-means clustering.
<i>CorrelatedSamples</i>	Generates correlated samples from uncorrelated ones.
<i>CorrMatrix</i> <i>CovMatrix</i>	Calculate the correlation matrix or the covariance matrix of multiple random variable.
<i>DataCompleteRows</i> <i>DataCompleteRows2</i> <i>DataCountCompleteRows</i> <i>DataCountCompleteRows2</i> <i>DataTransform</i> <i>DataTransformTest</i> <i>MissingDataFill</i> <i>MissingDataMask</i>	Manipulation of missing data. Data transformation.
<i>DetrendPoly</i> <i>FitBezier</i> <i>FitPoly</i> <i>FitPolyCoeff</i> <i>FitPolyPt</i>	Used to fit the trends present in <i>X</i> vs <i>Y</i> data sets.
<i>InterpolateLinear</i> <i>InterpolateLinearPt</i> <i>InterpolatePoly</i> <i>InterpolatePolyPt</i> <i>InterpolateSpline</i> <i>InterpolateSplinePt</i>	Used for the interpolation.
<i>Kalman</i>	Applies the Kalman algorithm to a univariate time series.
<i>LogisticCoeff</i> <i>LogisticCoefOneVsAll</i> <i>LogisticConfMatrix</i> <i>LogisticConfMatrixMulti</i> <i>LogisticForecast</i> <i>LogisticForecastMulti</i>	Logistic regression. “One vs all” multiclass classification.

<i>AdjMatrix</i> <i>NetworkCommunityStruct</i> <i>NetworkCommunityStructAdj</i> <i>NetworkModularity</i> <i>NetworkModularityAdj</i>	Network modularity analysis and community structure.
<i>OLSANOVA</i> <i>OLSCoeff</i> <i>OLSForecast</i> <i>OLSLeverage</i> <i>OLSResiduals</i> <i>OLSStat</i> <i>OLSTest</i>	Linear regression by Ordinary Least Square (OLS) method.
<i>OutliersGet</i> <i>OutliersTrim</i>	Deal with the outliers.
<i>PCCommunality</i> <i>PCInputReduced</i> <i>PCLoads</i> <i>PCLoadsReduced</i> <i>PCScores</i> <i>PCVariance</i>	Principal component analysis (PCA) and dimension reduction.
<i>RandomBernoulli</i> <i>RandomBinomial</i> <i>RandomCauchy</i> <i>RandomChiSq</i> <i>RandomLognormal</i> <i>RandomNormal</i> <i>RandomPoisson</i> <i>RandomStudentT</i> <i>RandomUniform</i>	Generate random numbers for simulation.
<i>RangeFlip</i>	Flips a cell range if the condition is true.
<i>TableHisto</i> <i>TableQQGaussPlot</i> <i>TableQQPlot</i> <i>TableQQSTTPlot</i>	Generate tables for various types of data plots.
<i>TSACF</i> <i>TSACFAR</i> <i>TSACFARMA</i> <i>TSACFMA</i> <i>TSACFTest</i>	Calculate or test the Auto-Correlation Function (ACF).
<i>TSARCharRoots</i>	Calculates the characteristic roots using the AR parameters.

<i>TSARCHFit</i> <i>TSARCHForecast</i> <i>TSARCHSimul</i> <i>TSARCHVol</i>	Apply the Auto-Regressive Conditional Heteroskedasticity ARCH(p) model.
<i>TSARIMAFit</i> <i>TSARMAForecast</i> <i>TSARMASimul</i> <i>TSARSimul</i> <i>TSARStat</i>	Apply the Auto-Regressive Moving Average ARMA(p,q) model.
<i>TSCovARMAtoMA</i> <i>TSCovARtoMA</i> <i>TSCovMAtoAR</i>	Time series model conversions.
<i>TSDickeyFuller</i> <i>TSDickeyFullerAugmented</i>	Dickey-Fuller unit root test and its variant.
<i>TSDifference</i>	Applies difference operator to a time series.
<i>TSEngleGranger</i> <i>TSEngleGrangerSpread</i> <i>TSEngleGrangerSpreadForecast</i>	Apply Engle-Granger method for the cointegration test.
<i>TSGARCHFit</i> <i>TSGARCHForecast</i> <i>TSGARCHSimul</i> <i>TSGARCHVol</i>	Apply the Generalized Auto-Regressive Conditional Heteroskedasticity GARCH(p,q) model.
<i>TSHoltFit</i> <i>TSHoltForecast</i> <i>TSHoltSmooth</i>	Apply Holt's exponential smoothing method.
<i>TSIsInvertibleMA</i> <i>TSIsStationaryAR</i>	Calculate the characteristic roots and check for the stationarity or the invertibility.
<i>TSLjungBox</i>	Calculates the Ljung-Box test statistics and the p -values.
<i>TSLogRate</i>	Calculates the logarithmic rate of return.
<i>TSShowLag</i>	Shows the lagged steps of a time series.
<i>TSVARFit</i> <i>TSVARFit2</i> <i>TSVARForecast</i> <i>TSVARSimul</i>	Apply the Vector Auto-Regressive (VAR) model to a multivariate time series.
<i>TSVECMFit</i> <i>TSVECMForecast</i> <i>TSVECMSimul</i>	Apply the Vector Error Correction Model (VECM) to a multivariate time series.

Getting Help

There are three PrimaXL manuals, each one with a different purpose. These manuals should provide most of the help you will need.

1. Quick Start Guide ([Free](#))

It guides the user through the installation process. It provides a quick introduction and overview of the PrimaXL ribbon menu and functions.

2. User's Reference Manual ([Free](#))

It provides detailed explanations of the PrimaXL functions. The functions are listed in the alphabetical order for easy consultation.

3. User's Guide ([Only with the purchase](#))

It explains the use of PrimaXL with examples. It is intended to serve both as an instructional resource and as a practical help. As supplementary material, there are several Excel workbooks with sample data and examples.

If your question is still unanswered even after reading the manuals, please feel free to contact us by sending an email to:

contact@fianresearch.com

Also, our web-site *www.fianresearch.com* will show updates, fixes of the existing version and release of new versions.

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