Practical work 6 Fisher-Test

This example teaches you how to perform an F-Test in Excel. The F-Test is used to test the null hypothesis that the variances of two populations are equal.

Below you can find the study hours of 6 female students and 5 male students.

$$\begin{split} H_0: &\sigma_1{}^2 = \sigma_2{}^2 \\ H_1: &\sigma_1{}^2 \neq \sigma_2{}^2 \end{split}$$

	А	В	С
1	Female	Male	
2	26	23	
3	25	30	
4	43	18	
5	34	25	
6	18	28	
7	52		
8			

To perform an F-Test, execute the following steps.

1. On the Data tab, in the Analysis group, click Data Analysis.



2. Select F-Test Two-Sample for Variances and click OK.

Data Analysis	?	\times
<u>A</u> nalysis Tools		NK .
Anova: Single Factor Anova: Two-Factor With Replication Anova: Two-Factor Without Replication Correlation Covariance	Car <u>H</u> e	ncel
Descriptive Statistics Exponential Smoothing F-Test Two-Sample for Variances Fourier Analysis Histogram		

- 3. Click in the Variable <u>1</u> Range box and select the range A2:A7.
- 4. Click in the Variable <u>2</u> Range box and select the range B2:B6.
- 5. Click in the Output Range box and select cell E1.

F-Test Two-Sample for Variar	? ×	
Input Variable <u>1</u> Range: Variable <u>2</u> Range: Labels <u>A</u> lpha: 0.05	SAS2:SAS7 💽 SBS2:SBS6	OK Cancel <u>H</u> elp
Output options	SES1	

6. Click OK.

Result:

E	F	G
F-Test Two-Sample for Variances		
	Variable 1	Variable 2
Mean	33	24.8
Variance	160	21.7
Observations	6	5
df	5	4
F	7.373271889	
P(F<=f) one-tail	0.037888376	
F Critical one-tail	6.256056502	

Important: be sure that the variance of Variable 1 is higher than the variance of Variable 2. This is the case, 160 > 21.7. If not, swap your data. As a result, Excel calculates the correct F value, which is the ratio of Variance 1 to Variance 2 (F = 160 / 21.7 = 7.373).

Conclusion: if F > F Critical one-tail, we reject the null hypothesis. This is the case,

7.373 > 6.256. Therefore, we reject the null hypothesis. The variances of the two populations are unequal.

Ex: Apply the above in series 6.