

How do I perform a Variance Ratio Test in Excel?”

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A Variance Ratio Test is a statistical tool used to analyze the variability of a data set and determine if it follows a certain pattern. In Excel, this test can be performed by following a few simple steps. First, the data set needs to be organized in a column or row format. Then, the Excel function "VAR" can be used to calculate the variance of the data set. Next, the variance ratio can be calculated by dividing the larger variance by the smaller variance. Finally, the variance ratio can be compared to a critical value to determine if the data set exhibits a specific pattern or not. This test can be useful in various fields such as finance, economics, and engineering. By performing a Variance Ratio Test in Excel, one can easily analyze the variability of a data set and make informed decisions based on the results.

Perform a Variance Ratio Test in Excel

A variance ratio test is used to test whether or not two population variances are equal.

This test uses the following null and alternative hypotheses:

H₀: The population variances are equal
H_A: The population variances are not equal

To perform this test, we calculate the following test statistic:

$$F = s_1^2 / s_2^2$$

where:

s₁²: The sample variance of the first groups
s₂²: The

sample variance of the second group

If the that corresponds to this F test-statistic is less than a certain threshold (e.g. 0.05) then we reject the null hypothesis and conclude that the population variance are not equal.

The following step-by-step example shows how to perform a variance ratio test in Excel.

Step 1: Enter the Data

Suppose we want to know if two different species of plants have the same variance in height.

To test this, we collect a simple random sample of 15 plants from each species.

First, we'll enter the heights for each species:

	A	B	C	D	E	F
1	Group 1	Group 2				
2	5	9				
3	6	9				
4	6	10				
5	8	12				
6	10	12				
7	12	13				
8	12	14				
9	13	16				
10	14	16				
11	15	19				
12	15	22				
13	17	24				
14	18	26				
15	18	29				
16	19	29				
17						
18						
19						
20						
21						
22						

Step 2: Calculate the F Test Statistic

Next, we'll type the following formula into cell E1 to calculate the F test-statistic:

=VAR.S(A2:A16)/VAR.S(B2:B16)

	A	B	C	D	E	F	G
1	Group 1	Group 2		F	0.437178		
2	5	9					
3	6	9					
4	6	10					
5	8	12					
6	10	12					
7	12	13					
8	12	14					
9	13	16					
10	14	16					
11	15	19					
12	15	22					
13	17	24					
14	18	26					
15	18	29					
16	19	29					
17							
18							
19							
20							

The F test-statistic turns out to be 0.437178.

Step 3: Calculate the P-Value

Next, we'll type the following formula into cell E2 to calculate the p-value that corresponds to the F test-statistic:

=F.DIST(E1, COUNT(A2:A16)-1, COUNT(B2:B16)-1, TRUE)*2

	A	B	C	D	E	F	G	H	I
1	Group 1	Group 2		F	0.437178				
2	5	9		p	0.133596				
3	6	9							
4	6	10							
5	8	12							
6	10	12							
7	12	13							
8	12	14							
9	13	16							
10	14	16							
11	15	19							
12	15	22							
13	17	24							
14	18	26							
15	18	29							
16	19	29							
17									
18									
19									
20									
21									
22									
23									
24									

Note: In the formula, we multiplied by 2 at the end to produce a two-tailed p-value.

The p-value turns out to be 0.133596.

Recall the null and alternative hypotheses for this test:

H0: The population variances are equal
HA: The population variances are not equal

Because the p-value of our test (.133596) is not less than 0.05, we fail to reject the null hypothesis.

This means we do not have sufficient evidence to conclude that the variance in plant height between the two species is unequal.

The following tutorials explain how to perform other common tasks in Excel:

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