

RUNS TEST



DR. SANGEETA MOHANTY

RUNS TEST IS A STATISTICAL TEST USED TO TEST THE RANDOMNESS OF THE SAMPLE. A RUN IS A SEQUENCE OF LIKE OBSERVATIONS. FOR INSTANCE, THERE ARE SEVEN RUNS IN THE FOLLOWING SEQUENCE OF M AND F. MMMM FFF M FFFF M FFFF MMM RUN TEST OF RANDOMNESS IS PARTICULARLY APPLIED IN THE STOCK MARKET TO KNOW IF THE STOCK PRICE OF A PARTICULAR COMPANY BEHAVES RANDOMLY OR FOLLOW ANY PATTERN.

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INTRODUCTION

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MMMM FFF M FFFF M FFFF MMM

RUN TEST OF RANDOMNESS IS PARTICULARLY APPLIED IN THE STOCK MARKET TO KNOW IF THE STOCK PRICE OF A PARTICULAR COMPANY BEHAVES RANDOMLY OR FOLLOW ANY PATTERN.

THE HYPOTHESES FOR THIS TEST ARE:

NULL HYPOTHESIS- H_0 : THE SAMPLE IS RANDOM IN NATURE.

ALTERNATIVE HYPOTHESIS- H_1 : THE SAMPLE IS NOT RANDOM.

1) RUN TEST WITH INTERVAL OR RATIO SCALE MEASUREMENT

CASE ANALYSIS-1

PROBLEM

A STUDY IS CONDUCTED TO TEST THE RANDOMNESS OF THE SAMPLE STOCK PRICES AS GIVEN BELOW.

TABLE-1: INPUT DATA

SL. No.	PRICE	SL. No.	PRICE	SL. No.	PRICE
1	43.05	12	65.2	23	44.5
2	43.4	13	56.6	24	45.6
3	41.75	14	55.6	25	44.6
4	42.65	15	55	26	43.2
5	43.6	16	56.3	27	44.2
6	43.4	17	45.3	28	41.25
7	43.5	18	49	29	42.3
8	42.6	19	46.5	30	42.3
9	42.3	20	56.6	31	52.6
10	45.6	21	55.6	32	56.3
11	45.6	22	46.5	33	55.3

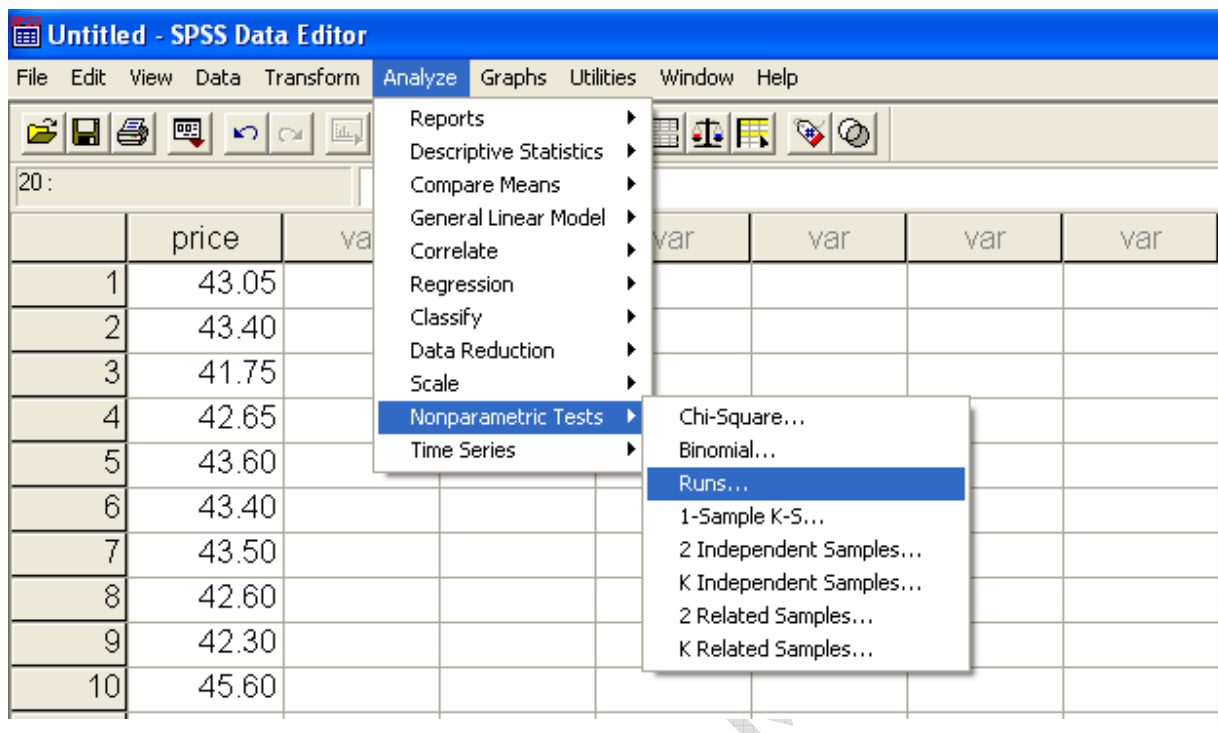
NULL HYPOTHESIS- H_0 : THE STOCK PRICE IS RANDOM IN NATURE.

ALTERNATIVE HYPOTHESIS- H_1 : THE STOCK PRICE IS NOT RANDOM

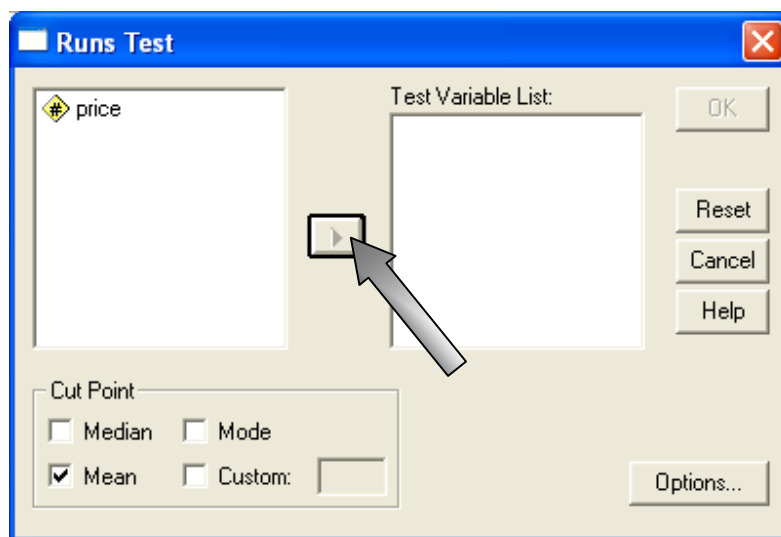
PERFORMING THE ANALYSIS WITH SPSS

FOR SPSS VERSION 11, CLICK ON **ANALYZE** → **NONPARAMETRIC TESTS** → **RUNS**

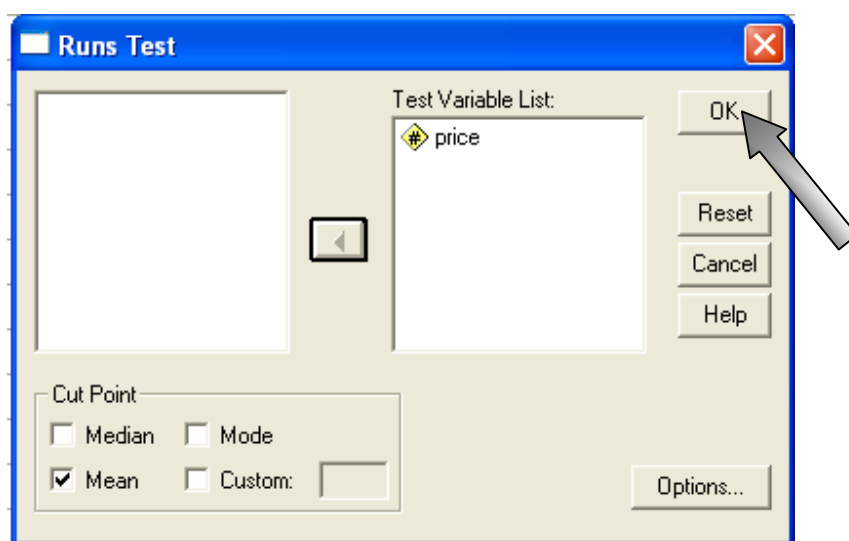
THIS WILL BRING UP THE SPSS SCREEN DIALOGUE BOX AS SHOWN BELOW.



AFTER CLICKING RUNS, THIS WILL BRING UP THE SPSS SCREEN DIALOGUE BOX AS SHOWN BELOW.



SELECT THE VARIABLE AND MOVE IT TO TEST VARIABLE LIST BOX AND CLICK MEAN.



FINALLY CLICK OK.

SPSS OUTPUT

THE SPSS OUTPUTS ARE GIVEN IN FOLLOWING TABLES.

TABLE-2: RUNS TEST

	PRICE
TEST VALUE	47.8121
CASES < TEST VALUE	22
CASES > = TEST VALUE	11
TOTAL CASES	33
NUMBER OF RUNS	8
Z	-2.863
ASYMP. SIG. (2-TAILED)	.004

A MEAN

FROM THE OUTPUT, $Z = -2.86$

DECISION

REJECT THE NULL HYPOTHESIS IF P-VALUE (SIG. (2-TAILED)) ≤ 0.05

INTERPRETATION

THE P-VALUE IS 0.004 AND IT IS LESS THAN 0.05 (5% LEVEL OF SIGNIFICANCE), SO WE REJECT THE NULL HYPOTHESIS AND ACCEPT THE ALTERNATIVE HYPOTHESIS. THE RANDOMNESS OF THE SAMPLE IS THEREFORE REJECTED.

SPSS COMMAND (INTERVAL OR RATIO SCALE MEASUREMENT)

1. CLICK ON ANALYZE AT THE SPSS MENU BAR (IN OLDER VERSIONS OF SPSS, CLICK ON STATISTICS INSTEAD OF ANALYZE).
2. CLICK ON NON-PARAMETRIC TEST FOLLOWED BY RUNS.
3. SELECT THE CONCERNED NUMERIC VARIABLE AND MOVE IT TO TEST VARIABLE LIST BOX.
4. CLICK MEAN OR MEDIAN DEPENDING ON THE DESIRED CUT-OFF VALUE.
5. CLICK OK OF THE MAIN DIALOGUE BOX.

ii) RUN TEST TEST WITH NOMINAL SCALE MEASUREMENT

CASE ANALYSIS-1

PROBLEM

A SURVEY IS CONDUCTED IN A METRO CITY WHETHER THE INHABITANTS ARE IN FAVOUR (Y) OR AGAINST (N) OF 'JOINT FAMILY'. THE SEQUENCE OF RESPONSES TO THE QUESTIONS ASKED IS GIVEN BELOW.

TABLE-1: SAMPLE DATA

SL. No	RESPONSE	SL. No.	RESPONSE
1	Y	23	Y
2	N	24	Y
3	N	25	Y
4	N	26	N
5	N	27	N
6	Y	28	N
7	Y	29	Y
8	Y	30	Y
9	Y	31	N
10	N	32	Y
11	Y	33	Y
12	Y	34	N
13	N	35	N
14	N	36	Y
15	Y	37	N
16	N	38	N
17	Y	39	Y
18	N	40	Y
19	Y	41	N
20	N	42	N
21	N	43	Y
22	Y	44	N

THE INTEREST IS TO TEST THE RANDOMNESS OF THE RESPONSES

NULL HYPOTHESIS- H_0 : THE RESPONSE IS RANDOM IN NATURE.

ALTERNATIVE HYPOTHESIS- H_1 : THE RESPONSE IS NOT RANDOM.

INPUT DATA

SINCE THE NOMINAL SCALE NEEDS TO BE CODED, THE CODES USED FOR Y IS 1 AND (-1) FOR N.

TABLE-1: INPUT DATA

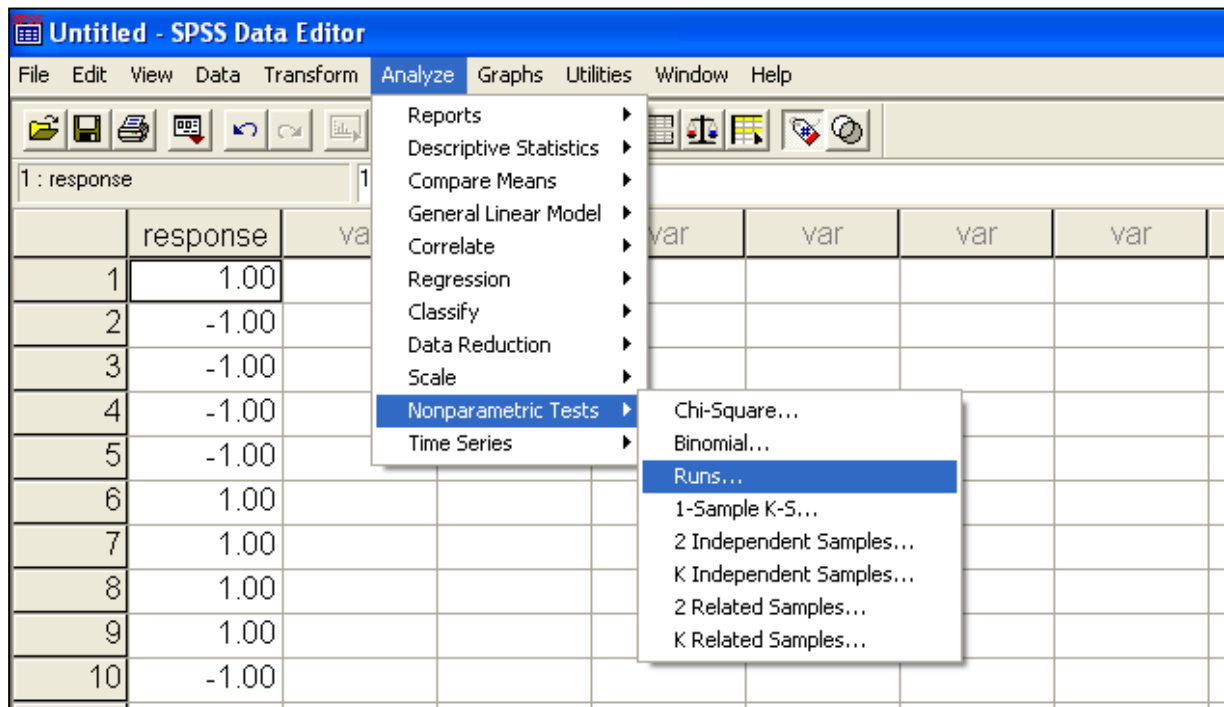
SL. No	RESPONSE	CODE	SL. No.	RESPONSE	CODE
1	Y	1	23	Y	1

2	N	-1	24	Y	1
3	N	-1	25	Y	1
4	N	-1	26	N	-1
5	N	-1	27	N	-1
6	Y	1	28	N	-1
7	Y	1	29	Y	1
8	Y	1	30	Y	1
9	Y	1	31	N	-1
10	N	-1	32	Y	1
11	Y	1	33	Y	-1
12	Y	1	34	N	-1
13	N	-1	35	N	-1
14	N	-1	36	Y	1
15	Y	1	37	N	-1
16	N	-1	38	N	-1
17	Y	1	39	Y	1
18	N	-1	40	Y	1
19	Y	1	41	N	-1
20	N	-1	42	N	-1
21	N	-1	43	Y	1
22	Y	1	44	N	-1

PERFORMING THE ANALYSIS WITH SPSS

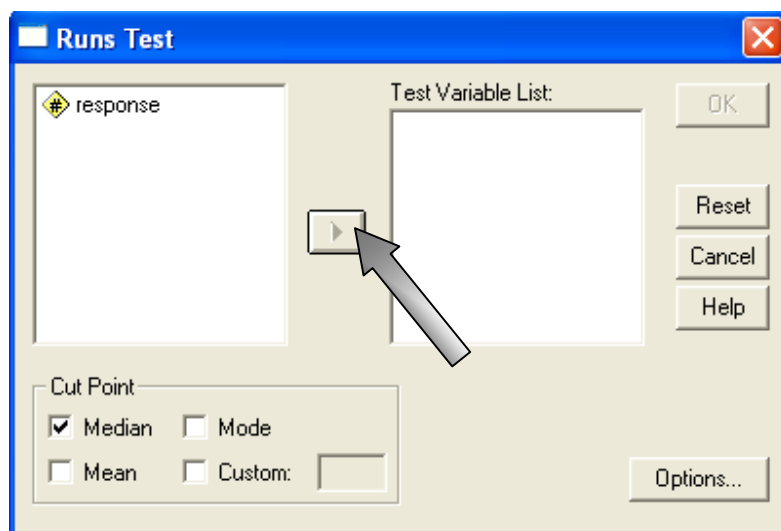
FOR SPSS VERSION 11, CLICK ON ANALYZE → NONPARAMETRIC TESTS → RUNS.

THIS WILL BRING UP THE SPSS SCREEN DIALOGUE BOX AS SHOWN BELOW

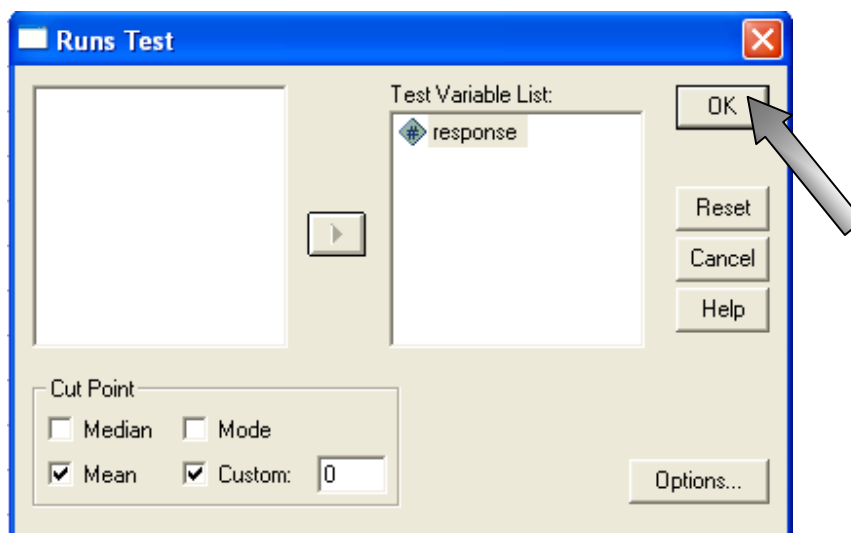


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AFTER CLICKING RUNS, THIS WILL BRING UP THE SPSS SCREEN DIALOGUE BOX AS SHOWN BELOW



SELECT THE VARIABLE AND MOVE IT TO TEST VARIABLE LIST BOX AND CLICK MEAN.



CLICK **CUSTOM** AND GIVE ITS VALUE '0'. FINALLY CLICK **OK** TO GET THE OUTPUT.

SPSS OUTPUT

TABLE-2: RUNS TEST

	RESPONSE
TEST VALUE	-.0455
CASES < TEST VALUE	23
CASES >= TEST VALUE	21
TOTAL CASES	44
NUMBER OF RUNS	24
Z	.167
ASYMP. SIG. (2-TAILED)	.868

A MEAN

TABLE-3: RUNS TEST 2

	RESPONSE
TEST VALUE	0
TOTAL CASES	44
NUMBER OF RUNS	24
Z	.167
ASYMP. SIG. (2-TAILED)	.868

A USER-SPECIFIED.

FROM THE OUTPUT, Z = 0.167

DECISION

REJECT THE NULL HYPOTHESIS IF P-VALUE (SIG. (2-TAILED)) ≤ 0.05

INTERPRETATION

THE P-VALUE IS 0.868 AND IT IS MORE THAN 0.05 (5% LEVEL OF SIGNIFICANCE), SO WE ACCEPT THE NULL HYPOTHESIS AND REJECT THE ALTERNATIVE HYPOTHESIS. THE SAMPLE IS THEREFORE ACCEPTED AS RANDOM.

SPSS COMMAND (NOMINAL SCALE MEASUREMENT)

1. CLICK ON ANALYZE AT THE SPSS MENU BAR (IN OLDER VERSIONS OF SPSS, CLICK ON STATISTICS INSTEAD OF ANALYZE).
2. CLICK ON NON-PARAMETRIC TEST FOLLOWED BY RUNS.
3. SELECT THE CONCERNED NUMERIC VARIABLE AND MOVE IT TO TEST VARIABLE LIST BOX.
4. CLICK MEAN OR MEDIAN DEPENDING ON THE DESIRED CUT-OFF VALUE.
5. CLICK CUSTOM AND GIVE IT A '0' VALUE.
6. CLICK OK OF THE MAIN DIALOGUE BOX.

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