

```

SAVEOUTFILE=C:\users\jaswinder\Documents\finalyrproject\caseclus.sav '
COMPRESSED.
CLUSTER cases_reg2017 cases_reg2018 cases_reg2019 cases_reg2020 cases_reg2021 proj_popln2017
proj_popln2018 proj_popln2019 proj_popln2020 proj_popln2021
METHODBAVERAGE
MEASURE=SEUCLID
/ID=State
/PRINT SCHEDULE
/PLOT DENDROGRAMVICICLE.

```

Cluster

Notes

Output Created		02-APR-2023 21:06:49
Comments		
Input	Data	C:\users\jaswinder\Documents\finalyrproject\caseclus.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	28
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		CLUSTER cases_reg2017 cases_reg2018 cases_reg2019 cases_reg2020 cases_reg2021 proj_popln2017 proj_popln2018 proj_popln2019 proj_popln2020 proj_popln2021 /METHOD BAVERAGE /MEASURE=SEUCLID /ID=State /PRINT SCHEDULE /PLOT DENDROGRAM VICICLE.
Resources	Processor Time	00:00:01.57
	Elapsed Time	00:00:00.51

Case Processing Summary^{a,b}

Valid		Cases Missing		Total	
N	Percent	N	Percent	N	Percent
28	100.0	0	.0	28	100.0

a. Squared Euclidean Distance used

b. Average Linkage (Between Groups)

Average Linkage (Between Groups)

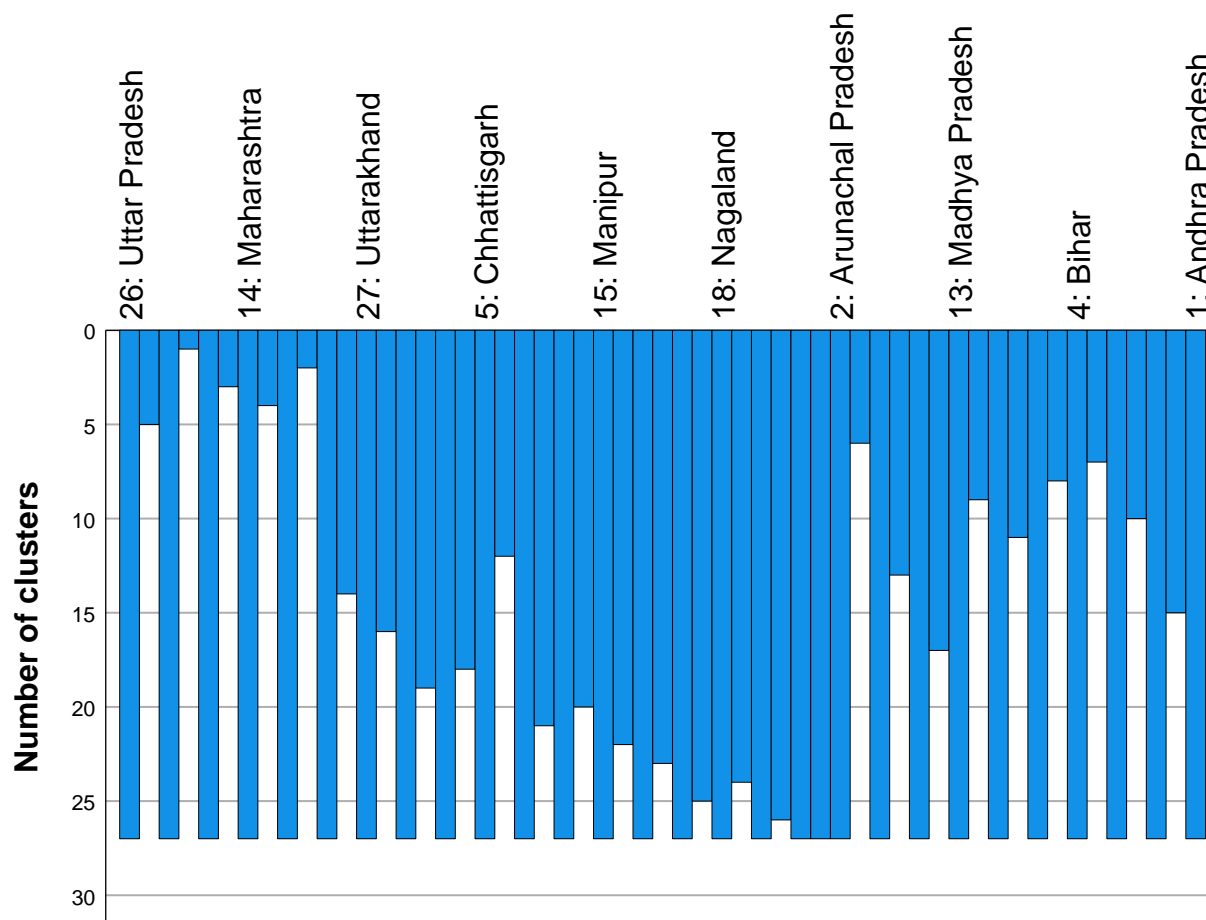
Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	2	17	705.320	0	0	2
2	2	6	1219.940	1	0	4
3	18	22	1333.400	0	0	4
4	2	18	2658.587	2	3	5
5	2	25	4629.772	4	0	6
6	2	15	12200.633	5	0	8
7	9	16	12388.470	0	0	8
8	2	9	32169.642	6	7	16
9	12	20	58061.860	0	0	10
10	5	12	129424.920	0	9	12
11	13	28	286595.030	0	0	15
12	5	27	330845.637	10	0	14
13	1	19	365134.310	0	0	18
14	5	8	451246.408	12	0	16
15	13	23	645591.025	11	0	19
16	2	5	999965.036	8	14	22
17	7	10	1031808.150	0	0	19
18	1	21	1225113.015	13	0	21
19	7	13	1829515.192	17	15	20
20	4	7	2373246.394	0	19	21
21	1	4	3832950.743	18	20	22
22	1	2	7174746.421	21	16	26
23	11	26	17333643.19	0	0	27
24	3	14	24176352.03	0	0	25
25	3	24	37746892.79	24	0	26

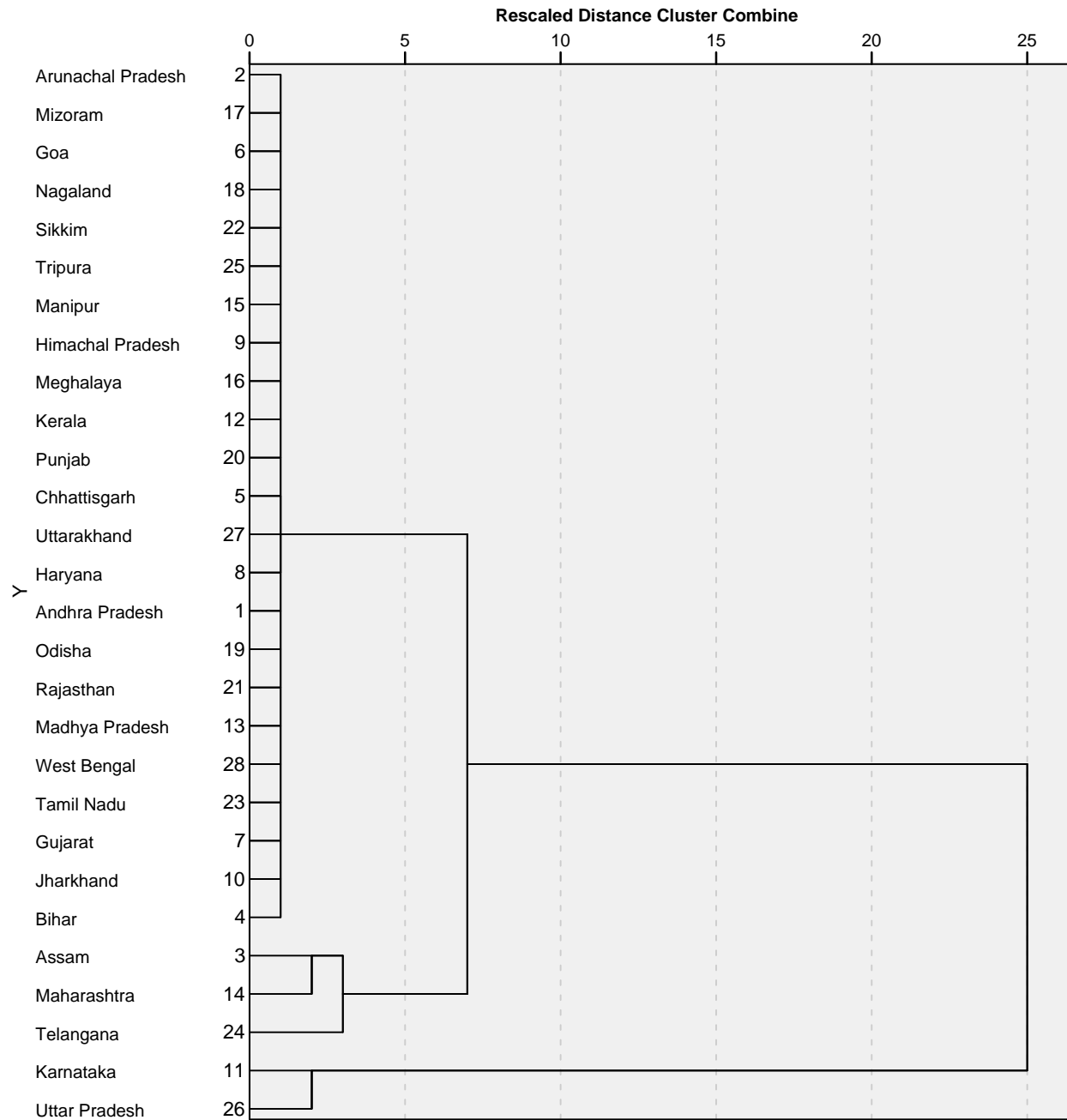
Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
26	1	3	83601854.87	22	25	27
27	1	11	329742263.5	26	23	0

Case



Dendrogram using Average Linkage (Between Groups)



```

QUICK CLUSTER cases_reg2017 cases_reg2018 cases_reg2019 cases_reg2020 cases_reg2021 proj_popln20
17
proj_popln2018 proj_popln2019 proj_popln2020 proj_popln2021
/MISSING=LISTWISE
/CRITERIA=CLUSTER(2)MXITER(10)CONVERGE(0)
/METHOD=KMEANS(NOUPDATE)
/PRINT ID(State) INITIALANOVACLUSTER DISTAN.
    
```

Quick Cluster

Notes

Output Created		02-APR-2023 21:07:23
Comments		
Input	Data	C:\users\jaswinder\Documents\finalyrproject\caseclus.sav
	Active Dataset	DataSet1
	Filter	<none>
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	Split File	<none>
	N of Rows in Working Data File	28
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any clustering variable used.
Syntax		QUICK CLUSTER cases_reg2017 cases_reg2018 cases_reg2019 cases_reg2020 cases_reg2021 proj_popln2017 proj_popln2018 proj_popln2019 proj_popln2020 proj_popln2021 /MISSING=LISTWISE /CRITERIA=CLUSTER (2) MXITER(10) CONVERGE(0) /METHOD=KMEANS (NOUPDATE) /PRINT ID(State) INITIAL ANOVA CLUSTER DISTAN.
Resources	Processor Time	00:00:00.03
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	Workspace Required	1776 bytes

Initial Cluster Centers

	Cluster	
	1	2
cases_reg2017	4971	1
cases_reg2018	6280	1
cases_reg2019	11416	2
cases_reg2020	11097	0
cases_reg2021	8829	0
proj_popln2017	2226.1	6.6
proj_popln2018	2230.0	6.6
proj_popln2019	2259.7	6.7
proj_popln2020	2289.3	6.7
proj_popln2021	2317.0	6.8

Iteration History^a

Iteration	Change in Cluster Centers	
	1	2
1	3952.704	1896.763
2	2486.248	427.792
3	.000	.000

a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 3. The minimum distance between initial centers is 20518.133.

Cluster Membership

Case Number	State	Cluster	Distance
1	Andhra Pradesh	2	2315.285
2	Arunachal Pradesh	2	1497.070
3	Assam	2	5482.451
4	Bihar	2	2160.289
5	Chhattisgarh	2	825.209
6	Goa	2	1485.057
7	Gujarat	2	1225.711
8	Haryana	2	290.097
9	Himachal Pradesh	2	1335.505
10	Jharkhand	2	964.628
11	Karnataka	1	5371.881
12	Kerala	2	443.370
13	Madhya Pradesh	2	1136.315
14	Maharashtra	1	4719.031
15	Manipur	2	1426.308
16	Meghalaya	2	1339.860
17	Mizoram	2	1515.318
18	Nagaland	2	1523.429
19	Odisha	2	2060.186
20	Punjab	2	607.455
21	Rajasthan	2	2138.042
22	Sikkim	2	1548.404
23	Tamil Nadu	2	958.755
24	Telangana	1	7458.744
25	Tripura	2	1470.458
26	Uttar Pradesh	1	6034.596
27	Uttarakhand	2	924.878
28	West Bengal	2	1431.368

Final Cluster Centers

	Cluster	
	1	2
cases_reg2017	3240	357
cases_reg2018	4209	421
cases_reg2019	7774	559
cases_reg2020	8090	723
cases_reg2021	8208	817
proj_popln2017	1112.1	335.0
proj_popln2018	1117.2	349.8
proj_popln2019	1129.4	353.4
proj_popln2020	1141.6	357.7
proj_popln2021	1153.1	361.3

Distances between Final Cluster Centers

Cluster	1	2
1		13661.367
2	13661.367	

ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
cases_reg2017	28484041.52	1	410381.397	26	69.409	.000
cases_reg2018	49198544.02	1	859144.388	26	57.265	.000
cases_reg2019	178451688.1	1	2906933.075	26	61.388	.000
cases_reg2020	186056742.9	1	1892937.878	26	98.290	.000
cases_reg2021	187283716.7	1	1460186.013	26	128.260	.000
proj_popln2017	2070349.821	1	172615.461	26	11.994	.002
proj_popln2018	2019073.251	1	184453.905	26	10.946	.003
proj_popln2019	2064270.871	1	189214.757	26	10.910	.003
proj_popln2020	2106832.037	1	194156.095	26	10.851	.003
proj_popln2021	2149148.823	1	198847.745	26	10.808	.003

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

Cluster	1	4.000
	2	24.000
Valid		28.000
Missing		.000

Notes

Output Created		02-APR-2023 21:07:58
Comments		
Input	Data	C:\users\jaswinder\Documents\finalyrproject\caseclus.sav
	Active Dataset	DataSet1
	Filter	<none>
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	Split File	<none>
	N of Rows in Working Data File	28
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any clustering variable used.
Syntax		QUICK CLUSTER cases_reg2017 cases_reg2018 cases_reg2019 cases_reg2020 cases_reg2021 proj_popln2017 proj_popln2018 proj_popln2019 proj_popln2020 proj_popln2021 /MISSING=LISTWISE /CRITERIA=CLUSTER (4) MXITER(10) CONVERGE(0) /METHOD=KMEANS (NOUPDATE) /PRINT ID(State) INITIAL ANOVA CLUSTER DISTAN.
Resources	Processor Time	00:00:00.02
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	Workspace Required	2520 bytes

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QUICK CLUSTER cases_reg2017 cases_reg2018 cases_reg2019 cases_reg2020 cases_reg2021 proj_popln20
17
proj_popln2018 proj_popln2019 proj_popln2020 proj_popln2021
/MISSING=LISTWISE
/CRITERIA=CLUSTER(3)MXITER(10)CONVERGE(0)
/METHOD=KMEANS(NOUPDATE)
/PRINT ID(State) INITIAL ANOVA CLUSTER DISTAN.

```

Quick Cluster

Notes

Output Created		02-APR-2023 21:08:32
Comments		
Input	Data	C: \users\jaswinder\Documents\finalyrproject\caseclus. sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	28
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any clustering variable used.
Syntax		QUICK CLUSTER cases_reg2017 cases_reg2018 cases_reg2019 cases_reg2020 cases_reg2021 proj_popln2017 proj_popln2018 proj_popln2019 proj_popln2020 proj_popln2021 /MISSING=LISTWISE /CRITERIA=CLUSTER (3) MXITER(10) CONVERGE(0) /METHOD=KMEANS (NOUPDATE) /PRINT ID(State) INITIAL ANOVA CLUSTER DISTAN.

Notes

Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02
	Workspace Required	2144 bytes

Initial Cluster Centers

	Cluster		
	1	2	3
cases_reg2017	1209	1	4971
cases_reg2018	1205	1	6280
cases_reg2019	2691	2	11416
cases_reg2020	5024	0	11097
cases_reg2021	10303	0	8829
proj_popln2017	371.3	6.6	2226.1
proj_popln2018	370.3	6.6	2230.0
proj_popln2019	372.8	6.7	2259.7
proj_popln2020	375.4	6.7	2289.3
proj_popln2021	377.7	6.8	2317.0

Iteration History^a

Iteration	Change in Cluster Centers		
	1	2	3
1	3753.683	1352.791	2081.685
2	.000	.000	.000

a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 2. The minimum distance between initial centers is 11924.966.

Cluster Membership

Case Number	State	Cluster	Distance
1	Andhra Pradesh	2	2532.801
2	Arunachal Pradesh	2	1303.523
3	Assam	1	2819.916
4	Bihar	2	2278.582
5	Chhattisgarh	2	603.211
6	Goa	2	1291.050
7	Gujarat	2	1423.115
8	Haryana	2	258.397
9	Himachal Pradesh	2	1134.959
10	Jharkhand	2	1151.242
11	Karnataka	3	2081.685
12	Kerala	2	252.530
13	Madhya Pradesh	2	1148.973
14	Maharashtra	1	3343.848
15	Manipur	2	1232.291
16	Meghalaya	2	1151.131
17	Mizoram	2	1320.798
18	Nagaland	2	1325.931
19	Odisha	2	2290.786
20	Punjab	2	406.799
21	Rajasthan	2	2313.904
22	Sikkim	2	1352.791
23	Tamil Nadu	2	1014.113
24	Telangana	1	3753.683
25	Tripura	2	1271.604
26	Uttar Pradesh	3	2081.685
27	Uttarakhand	2	802.777
28	West Bengal	2	1411.092

Final Cluster Centers

	Cluster		
	1	2	3
cases_reg2017	1978	324	4073
cases_reg2018	2246	351	6060
cases_reg2019	3296	486	11718
cases_reg2020	4683	601	10919
cases_reg2021	6904	641	8483
proj_popln2017	640.2	335.2	1428.5
proj_popln2018	641.5	350.2	1442.3
proj_popln2019	647.4	353.8	1459.7
proj_popln2020	653.4	358.2	1477.2
proj_popln2021	659.0	361.7	1493.5

Distances between Final Cluster Centers

Cluster	1	2	3
1		8398.963	11598.673
2	8398.963		18624.631
3	11598.673	18624.631	

ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
cases_reg2017	15381712.35	2	335621.327	25	45.831	.000
cases_reg2018	32750070.33	2	241446.298	25	135.641	.000
cases_reg2019	120951296.1	2	485174.235	25	249.295	.000
cases_reg2020	112154035.2	2	438602.291	25	255.708	.000
cases_reg2021	99088324.05	2	1082876.196	25	91.505	.000
proj_popln2017	1162994.331	2	169294.526	25	6.870	.004
proj_popln2018	1152919.070	2	180361.466	25	6.392	.006
proj_popln2019	1181446.326	2	184838.476	25	6.392	.006
proj_popln2020	1208638.063	2	189504.576	25	6.378	.006
proj_popln2021	1235512.332	2	193926.621	25	6.371	.006

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

**Number of Cases in
each Cluster**

Cluster	1	3.000
	2	23.000
	3	2.000
Valid		28.000
Missing		.000