"Dissemination of Education for Knowledge, Science and Culture"
-Shikshan maharshi Dr.Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

DATTAJIRAO KADAMARTS, SCIENCE AND COMMERCE COLLEGE, ICHALKARANJI

इचलकरंजी

नॅक मानांकन – 'A'

A

Project Report

On

"COMPARETIVE STUDY OF INCOME AND EXPENDITURE OF FAMILY BY USING STATISTICAL TECHNIQUES"

Submitted By

1. Aarti Ashok Mutkar.
2. Pradnya Shrikant Kumbhar.
3. Vaishnavi Murlidhar Satapute.
4. Farheen Ashpak Gavandi.
5. Samiya Firoj Alase.
6. Priyanka Sachin Teke

Submitted to

Department of Statistics

Dattajirao Kadam Arts, Science and Commerce College ,Ichalakaranji

2022-23

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DATTAJIRAO KADAM ARTS, SCIENCE ANDCOMMERCECOLLEGE, ICHALKARANJJI

Department of Statistics

CERTIFICATE

Date :13/05/2023

This to certify that below mentioned students has satisfactorily carried out the required project work prescribed by Shivaji University, Kolhapur for **B.Sc.III**Course in **STATISTICS.** The project entitled **"COMPARATIVE STUDY OF INCOME AND EXPENDITURE OF FAMILY BY USING STATISTICAL TECHNIQUES"** is his bonafied work in the year 2022-23.

Sr.No.	Name of Students	Exam Seat No.	Roll No.
1	Aarti Ashok Mutkar	32371	7271
2	Pradnya Shrikant Kumbhar	32369	7269
3	Vaishnavi Murlidhar Satpute	32373	7273
4	Farheen Ashpak Gavandi	32366	7266
5	Samiya Firoj Alase	32364	7264
6	Priyanka Sachin Teke	32374	7274

Mr. R.C.Sadalge
14/05/2023

Project Guide

14/05/23
Mr. A.P.Dhokare
HEAD,
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& Co[illegible] College
[illegible]

Dr. Anil Patil
Principal,
D.K.A.S.C. College,
Ichalkaranji.

ACKNOWLEDGEMENT

We wish to thank all people in rural and urban area who co-operate in conducting the necessary data. We would like express our profound gratitude to Mr. A. P. Dhokare Sir Head of Department of Statistics for valuable guidance in completion of this project. The DKASC College Ichalkaranji, for providing us necessary facilities.

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1.Aarti AshokMutkar.

2.Pradnya Shrikant Kumbhar.

3. VaishanviMurlidharSatpute.

4. SamiyaFirojAlase.

5.Farheen AshpakGavandi.

6.Priyanka SachinTeke.

INDEX:

Introduction :

A family budget can be defined as a finance design that assigns prospect income the direction of expenses , saving & debt re-payment. A family budget is a report which presents how family income is consumed on different components of expenditure. It uses information about the income of the family to prepare a family budget firms, governments, individuals & other organizations. Use it to the precise strategic planning of activities or events in measurable terms.

Family income can be defined as money or purchasing power earned by family members during specific period of time. Plus goods & services received or created in that time by the family goods like vegetable from kitchen, garden, services like teaching children , doing household chores etc. Nickel and Dorsey define income management as a " planning ,controlling and evaluating the use of all type of income". It purpose is to get greatest satisfaction from the resources on hand.

During rising inflation, lower & middle income groups household budget suffer a significant blow. With increased cost the household budget needs to be closely monitored along with yours spending. Many Indian household struggle to fit everyday items into the housing budget amid the inflation crises. Rising inflation is a significant causes of concern & has increased the cost living . In simple terms inflation is an increases in the price of goods and services. The rise in price result in decreasing the purchasing power of the consumer.

As the cost of everyday item increases the home budget is affected. Ultimately, consumers have no choice but to buy less & less. Increases in public spending, population growth, shortage, trade union etc. Are some of the causes of inflation. From biscuit & oils to LPG & fuel the cost of everyday has increased a lot in the past few months the rapid increases in consumer cost is due to soaring inflation

The global pandemic & Russia & Ukraine war have affected the supply chain of commodities like crude oil, contributing to inflation. The family budget provide the family a record of expenditure for future use, budget is very helpful where there is a scarcity of money, it service as a financial guide of the family , it can help in development of goods buymanship.

OBJECTIVES:

1. To identify from which schemes family get pension.
2. To study the distribution of expenditure of the family.
3. To find the most preferred insurance.
4. To study the relationship between expenditure & area.
5. To study the relationship between gender & type of insurance.
6. To study the relationship between saving & area.
7. To study the relationship between gender & type of pension

STUDY MATERIAL:

We constructed a questionnaire consisting of different questions was used to collect information regarding Income of family. The technique used for thedata collection from income of family by using convenient sampling scheme. The study area for this project was taken purposively in rural and urban area of Maharashtra state. The 172 sample size is taken for this study from that 88 from ruralarea and 84 from urban area.

TYPE OF DATA:

There are two types of data :

1. **Primary Data :** Any data that an investigator collects himself are termed as **Primary data.** Primary data includes surveys, observation, questionnaire, interviews. Collection time for primary data is long.

2. **Secondary Data :**Data taken from figures collected by others are termed as **Secondary data.** Secondary data includes website, articles, journals, books. Collection time for secondary data is short.

SOURCE OF DATA:

We have collected **Primary Data** of 2022 – 2023. We constructed a questionnaire consisting of different questions was used to collected information regarding the Income and Expenditure of Family.

Questionnaire Link :

http://forms.gle/wYR1f7tuVcVGggqk9

Statistical Tools Used:

- Graphical Representation
- T test
- Correlation
- Z-test
- Proportion

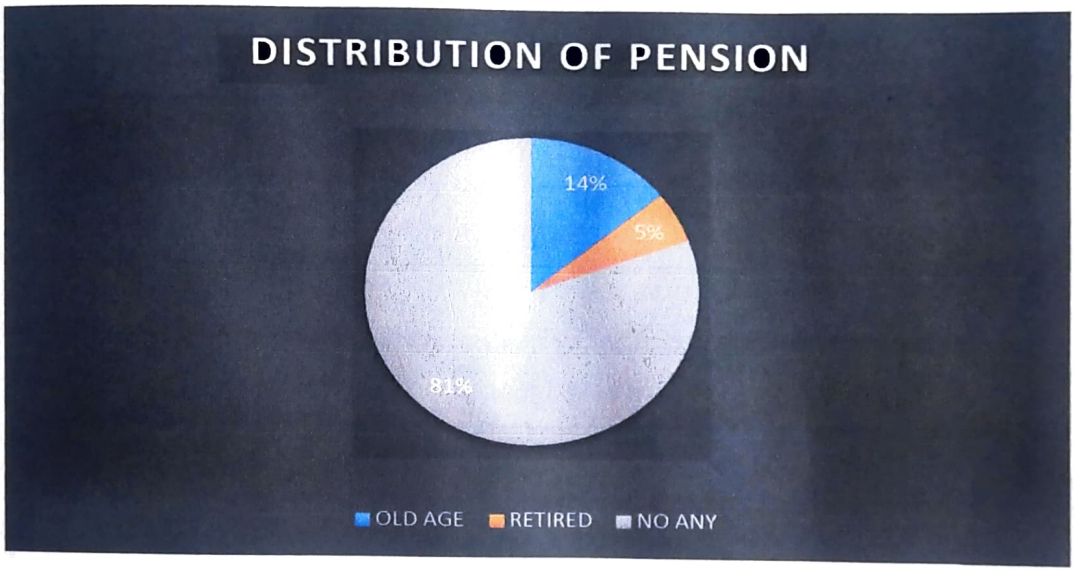
SOFTWARE USED:

- Microsoft World
- MS-Excel
- Google forms
- R-Software

STATISTICAL ANALYSIS

❖ EXPLORATORY DATA ANALYSIS

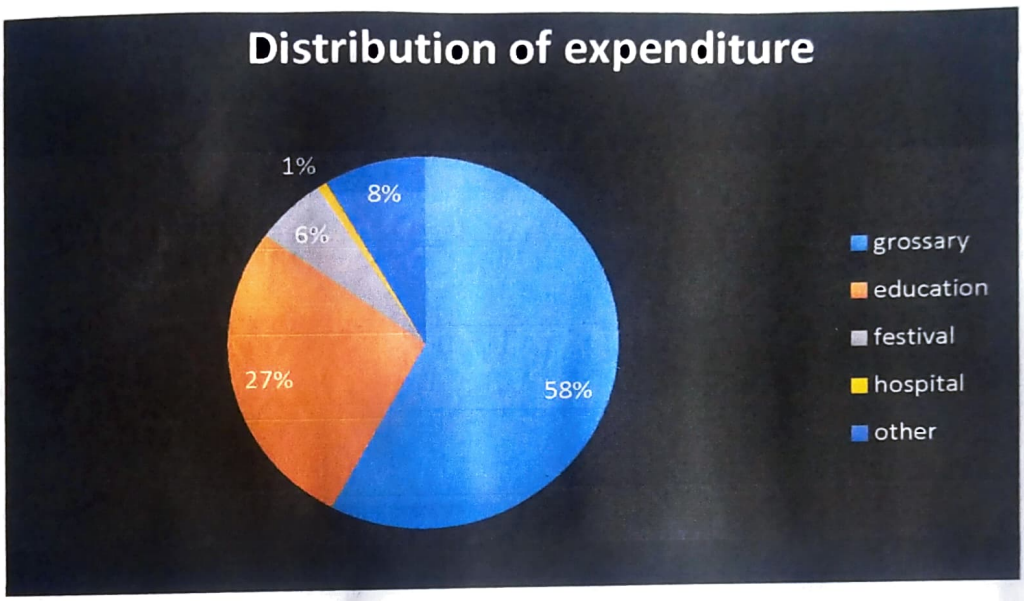
1. Pie diagram for Distribution of pension:



CONCLUSION :

From the above Pie diagram , we can conclude that, the most of people about 81% have no any type pension, about 14% of people have old age pension (like Indira Gandhi National Old Age Pension Scheme (like IGNOAPS etc.), National Pension Scheme (NPS), Pradhan MantriVayaYojana (PMVVY)) and only 5% of people have retired pension.

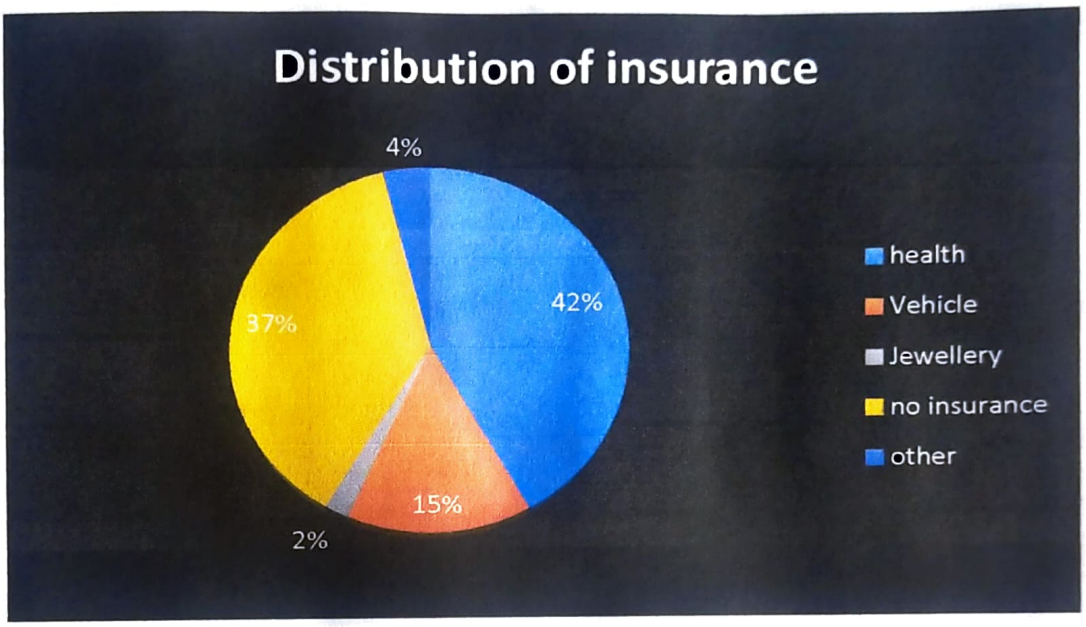
2. Simple Pie diagram for distribution of expenditure:



CONCLUSION:

From the above pie chart , we can observe that the household spend 58 % money of their income on grossary and only 1% on hospital .

3. Pie diagram for distribution of insurance:



CONCLUSION:

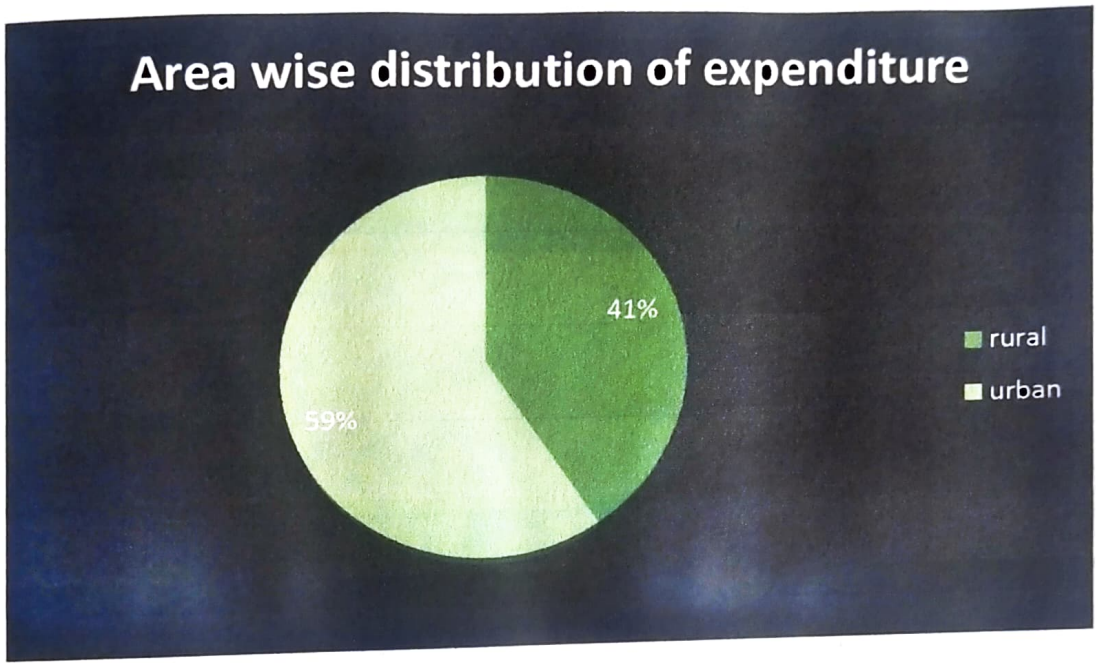
From the above pie diagram, we conclude that, the about 42% of people have take health insurance and only about 2% of people have take jewellery insurance.

5. Bar diagram for Year wise distribution of income.

CONCLUSION:

From the above bar diagram , we can observed that the annual income of peoples in 2022- 23 is higher than annual income in 2020-21 and 2021-22.

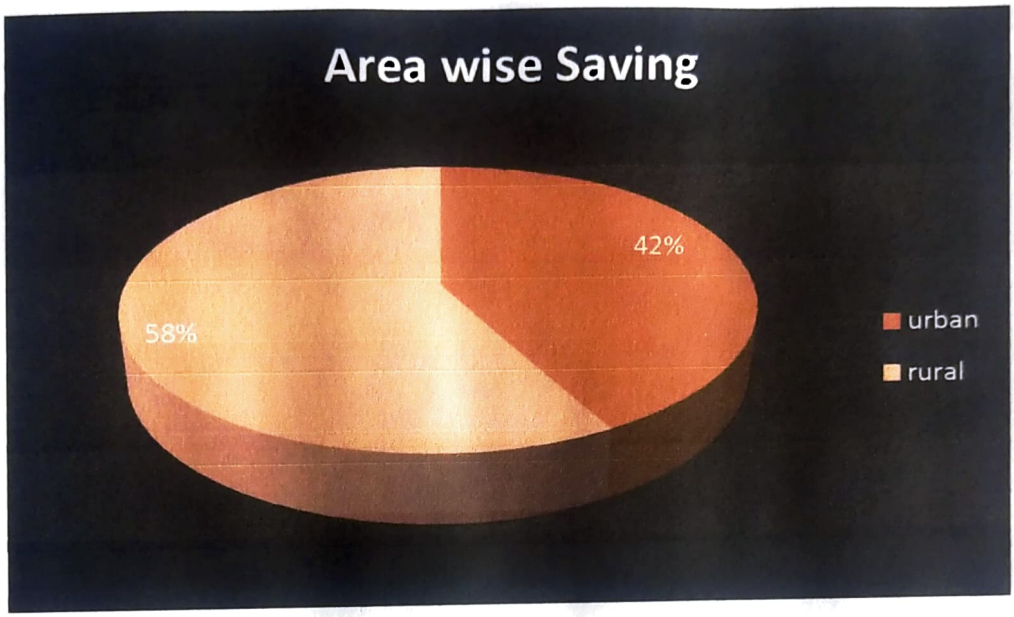
6. Pie diagram for area wise distribution of expenditure.



Conclusion:

From the above pie diagram we can conclude that, in the urban area people spend more money on expenditure as compared to rural area.

7. Pie diagram for area wise Saving:



Conclusion:

From the above pie diagram, we can conclude that, in rural area people save more money as compared to urban area.

TESTING OF HYPOTHESIS

• Test for equality of proportion:

I. Test for equality of proportion of gender who have pension.

Population 1: total number of males who have pension.

Population 2: total number of females who have pension.

P1: proportion of male who have pension

P2:proportion of female who have pension

Gender	Pension	Total
Male	14	390
Female	24	460

n1: Sample of total number of males who have pension=390

n2: Sample of total number of females who have pension=460

p1: Sample proportion male who have a pension.=0.0359

p2: Sample proportion female who have a pension.=0.0522

Level of significance =α=5%

Hypothesis :

$H_0 : P_1=P_2$ Against $H_1: P_1 \neq P_2$

Calculation : $\hat{p}=\frac{n_1 p_1+n_2 p_2}{n1+n2}$

$\hat{P}$=0.0447

$\hat{q}$=0.9553

Under H_0, the test statistics is,

$$Z_0 = \frac{p_1 - p_2}{\sqrt{\hat{p} \times \hat{q} \times \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Calculated value of Z is,

Z_0= -1.1442

Critical value = $Z_{\alpha/2}$= 1.96

CONCLUSION:

Calculated value Z_0 is less than the critical value. Hence we fail to reject H_0 at 5% level of significance and conclude that , there is equality in proportion of gender who have pension.

II. Test for equality of proportion of gender who have Insurance.

Population 1: total number of males who have Insurance.

Population 2: total number of females who have Insurance.

P1: proportion of male who have Insurance.

P2:proportion of female who have Insurance.

Gender	Insurance	Total
Male	76	390
Female	38	460

n1: Sample of total number of males who have pension=390

n2: Sample of total number of females who have pension=460

p1: Sample proportion male who have a pension=0.1949

p2: Sample proportion female who have a pension=0.0826

Level of significance =α=5%

Hypothesis :

$H_0: P_1=P_2$ Against $H_1: P_1 \neq P_2$

Calculation : $\hat{p}=\frac{n_1 p_1+n_2 p_2}{n1+n2}$

$\hat{P}=0.134$

$\hat{q}=0.8659$

Under H_0, the test statistics is,

$$Z_0=\frac{p_1-p_2}{\sqrt{\hat{p}\times\hat{q}\times\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$$

Calculated value of Z is,

Z_0=4.7859

Critical value= $Z_{\alpha/2}$= 1.96

CONCLUSION:

Calculated value Z_0 is greater than the critical value. Hence we reject H_0conclude that there is inequality in proportion of gender who have Insurance.

III .Z- Proportion Test :

A)

To test ,

H_0 : There is 29% of people have insurance. i.e $P_0 = 0.29$

H_1: There are greater than 29%people have insurance. i.e $P_0 > 0.29$

Hypothesis :

$H_0 : p = p_0$ V/S $H_1 : p \neq p_0$

Observation Table:

Insurance	**No. of person**
Yes	71
No	102

The test statistics,

$$Z = \frac{p - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = 3.548963$$

P-Value:

P-Value=0.0001933754

CONCLUSION:

Here p value is less than 0.05 then we reject H_0 at 5% Level of Significance and conclude that there is strong evidence to support the alternative hypothesis i.e. there are greater than 29% of people have insurance.

R-Commands:

```
>#Significance level
>Alpha=0.05
# enter the sample size , no of success and hypothesized proportion
>n=172
>x=71
>p0=0.29
 # calculate the sample proportion and standard error
Phat=x/n
Se=sqrt(p0*(1-p0)/n)
#calculate the test statistics and p-value
>z=(phat-p0)/se
>z
>pval=pnorm(-abs(z))
Pval
```

Output:

```
z
[1] 3.548963
Pval
[1] 0.0001933754
```

B)

To test ,

H_0 : There is 50% people or less than 50% of people have pension. i.e $P_0 <= 0.5$

H_1: 50% people or more than50% of people have no pension. i.e $P_0 > 0.5$

Hypothesis :

$H_0 : p = p_0$ V/S $H_1 : p \neq p_0$

Observation Table:

Insurance	**No. of person**
Yes	23
No	149

The test statistics,

$$Z = \frac{p - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = -9.60741$$

> pvalue

[1] 3.719841e-22 $\approx$ 0

CONCLUSION:

Here p value is less than 0.05 then we reject H_0 at 5% Level of Significance and conclude that there is strong evidence to support the alternative hypothesis i.e. more tan 50% of people have no pension.

R-Command:

```
>#Segnificance level
>Alpha=0.05
# enter the sample size , no of success and hypothesized proportion
>n=172
>x=23
>p0=0.5
 # calculate the sample proportion and standard error
Phat=x/n
Se=sqrt(p0*(1-p0)/n)
#calculate the test statistics and p-value
>z=(phat-p0)/se
>z
>pval=pnorm(-abs(z))
Pval
```

Output:

```
> z
[1] -9.60741
>pval
[1] 3.719841e-22 ≈ 0
```

- Test of Relation between Expenditure of Family and Total Number of Family Member.

X= Expenditure of family

Y= Total number of family

- **Given :**

n = 172

- **Calculation:**

Based on sample we calculate

Cov(XY) = 88930.175

σ_x = 365921.7865

σ_y = 2.450945171

r = 0.099157892

Testing of Hypothesis ,

Fisher Z- transformation,

H_0 = There is no- correlation between variable

i.e. $H_0 : \rho=0$

H_1= There is significant difference between two variable

i.e. $H_1: \rho\neq0$

Test Statistics :

$$Z=\frac{1}{2}Log_e\left(\frac{1+r}{1-r}\right)$$

=0.043205702

Level of significance $\alpha = 0.05$

Tabulated value of z= -1.644853627

CONCLUSION:

Here , Cal Z > Tab Z

Therefore we reject H_0at 5% level of significance and conclude that, there is strong evidence to support the alternative Hypothesis i.e. there is significant relationship between total no. of family number and expenditure of family.

Major Finding :

- Average expenditure by rural and urban area is equal.
- Average saving by rural and urban area is equal.
- There is equality in proportion of gender who have Insurance.
- There is equality in proportion of gender who have Pension.
- There are 29% people have Insurance.
- There are 50% people have Pension.
- The expenditure of family and total number of family can't depend on each other.
- In the health and vehicleInsurance the male candidate have more insurance policies as compared to female candidate.
- The about 42% of people have take health insurance and only about 2% of people have takejewellary insurance.
- About 58% of people spend money on grocery and only about 1% of people spend money on hospital.
- The people about 81% have no any type of pension , 14% people have old age pension and only 5% people have retired pension.

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