AN ESTIMATION OF THE CONSUMPTION PATTERN OF THE RURAL PEOPLE

PREPARED BY

ABDUL HALIM
LECTURER IN ECONOMICS
GOVT.MUJIB COLLEGE
P.O.BASHURHATH
P.S.COMPANIGONJ
DIST.NOAKHALI
MOBILE NO:01819-883314

Introduction

In the national income model consumption is very important variable .If consumption increases then GNP will plays an important role to determine GNP. Consumption increases national directly. On the other hand consumption increases national income in the multiplier process.

We can get following four theory of consumption.

l. Absolute income hypothesis --- J.M.Keynes .
2. Relative income hypothesis----Dusenbery .
3. Life cycle hypothesis------Ando ----Modigliani.
4. Permanent income hypotheises . ----- fried man.

We can see that consumption is a function of income. That is consumption depends on income .
The Keynesian consumption function is written as follow.

$$C=a+by .$$

It is a linear short run consumption function

l. a is autonomous consumption. When Y= 0 then c=a.
2. b is MPC , b is positive but less than one .lt is rate of changes of consumption due to income .
In this estimation of consumption function of the rural people I wanted to see that which factors determine the of the rural people. The aim of the present study is to estimate the autonomous consumption, MPC, and the co-efficient of different
qualitative and quantitive variable.

Two model was considered for shown the effect of qualitative and quantitive variable.
Mod1e-l represent the effect of quantitive variable.
Modle-2 shows the effect both variable.
Here used cross section data to estimate the model. The model is both linear in parameter and linear in variable. Here we see that the rural people have not same type of asset. They engage different activities. Their income and consumption was shown monthly in taka.

METHODOLOGY

For my study I selected Begumgonj Upazilla .For this purposes I have chosen two villages name Govindar khil and Fatika at Begumgonj upazilla from where I have collected these data. For the collection of data a questionnaire was prepared .
After preparation questionnaire direct interview was taken for data collection of the rural people village Govindar khil and Fatika .During the preparation of Questionnaire I have considered the pattern of the rural people.ln the consumption function I have included 9 variable as the dominating variable which determine the consumption pattern of that people. Here I computed then I discuss the obtained results. I wanted to find out that variable which determine the consumption expenditure of that people. 50 sample was selected to collect data. During the sample size as well as topic of the study I discussed

and took suggestions of my honorable teacher Professor Dr.Belyet Hossain Department of Economics. He guided me to collect data and run the model. After run the model he help me to represent the model and explain the results.

OLS (Ordinary Least Square) method used to estimate the model .The reason behind using this method is that OLS method is Best Liner Unbiased Estimates (BLUE).As the sample size increases then the be close to the population values.

The computer program "SPSS" used to estimate the model. And get the co-efficient of variables, standard error, t ratio, F ratio, value of R^2 and $\overline{R}^2$.

Durbin Watson (d- statistics) , VIF, Eigen value and conditional index use to detect Multicollinearity.And finally I detect Heteroscedasticity and remove it.

OBJECTIVES OF THE STUDY. .

1. I wanted to see that which factor determine the consumption pattern of the rural people. And what is the relationship exists between consumption and different Independent variable.
2. Here l wanted to find the relative, family size, gender, agriculture, abroad, profession, family planning, saving on the consumption expenditure.
3. Bangladesh is an agricultural country. About 70% people live in the village. Rural economy plays an important role in the total economy. Here I wanted to estimate their consumption function as a representative of rural economy.
4. Finally I derived MPC,MPS,APC,APS and draw a conclusion upon the value of multiplier effect of different economic policies of the people.

LIMITATIONS OF THE STUDY .

I collected data alone. I did not take help any body. I collected data from my home district. It is so distance from here .First I prepared a questionnaire then I went head of family to collect data.

First they are not agreeing to answer question they afraid to tell anything about his family. Then I request them and told them about the objectives of the study then they help me to collect data.

The main problem of the collection of data is that most of the rural people are illiterate and conservative they afraid about their family. Present study use cross section data due to lack of time series data.

And finally I have not sufficient time to complete a study successfully by using primary data.lt could possible better and increases sample size if time shortage is not factor.

THEORITICAL MODEL

The theory of consumption shows that consumption depends on income and wealth. Beside this there are many determinants of consumption expenditure such as family size, age, sex, profession, season, choice, taste, and relative prices of the commodities.

The consumption function can written as.

$C=f(X_1,X_2)$

Where

C=Consumption expenditure.

X_1 =Income.

X_2 =Wealth.

Only two variable include in this model. Other things constant.

This function aggregates over all consumers in the theoretical basis for the empirical study of the relationship between consumption and income .

EMPIRICAL MODEL

The theoretical model shown before There consumption depends on income ,wealth and some other variables. In the empirical analysis of cross section data of consumption. Here two model pattern.

First model consumption depends on family income and family size.

Second model consumption depends on family income, family size and six dummy variable.

The following is an empirical specification of consumption function to be estimated without dummy variable.

Model-l

$C=B_1+B_2\ Y+B_3N+U$

Where,

C=Consumption per family(per month in taka)

B_1 =Intercept term(Autonomous consumption)

Y=Family income(per month)

N=Family size.

U=Error term.

A priori expectation about the sign of the co-efficient are.

B_1 =(+); B_2 =(+) But greater than zero less than one.

B_3 =(+);The error term is assumed to be random and of white notice.

Serially independent having zero variance. Consumption function is linearly dependent on in come and family size.

Model=2

With dummy variable.

$$C=\alpha_1+\alpha_2\ Y+\alpha_3N+\alpha_4\ D_1+\alpha_5D_2+\alpha_6D_3+\alpha_7D_4+\alpha_8D_5+\alpha_9D_6+V$$

C=Consumption expenditure.

Y=Family income.

N=Family size.

D_1 =l if head of the family is male.

=0 Other wise.

D_2 =1 Agriculture
=0 Other wise
D_3 =l Abroad
=0 Other wise
D_4 =l Job
=0 Other wise
D_5 =l For receive family planning
=0 Other wise
D_6 =l lf the family is saver
=0 Other wise
V=Error term.

Dummy variable included the model for shown the effect of qualitative variable. The co-efficient of the dummy variable will help us to test the hypothesis that consumption will differ according six dummy variable. As for example α_3 shows that the consumption of an abroad family is greater α_3 amount than any other family.

RESULTS AND ANALYSIS

Model-l

The model fits very well. The adjusted R^2 was found .955 . lt means about 96% of the variation in the consumption has been explain by the repressors of the model. All slope co-efficient of the model found are found highly significant. The co-efficient of income(MPC) was found .669 .lt indicates if family income increases 1 taka then the family consumption increases .669 taka.lt is economically meaningful because MPC is greater than zero less then one.

Estimation of model -1

$$C=B_1+B_2 Y+B_3 N+U$$

Now applying OLS method of the collected data by the computer program "SPSS l0.01" we get the following results.

$$C=330.371+.669Y+l23.497N$$
$$(308.435)\quad (.022)\quad (60.631)$$
$$t=l.07l \qquad 30.625 \qquad 2.037$$
$$R^2=.957 \quad \bar{R}^2=.955 \quad F=518.266$$

Durbin-Watson(DW)=1.927 df=47.

Figure of the parenthesis are standard error.

On the other hand $\hat{B}_3$=123.497(The co-efficient of family size) indicates that if the family member increases l then family consumption increases 123.497 taka.lntercept term was found $\hat{B}_1$=330.37l. income and family size is assumed to be zero then family consumption is 330.371

Over all signilicancy test

The F test

$$F=\frac{ESS/(k-1)}{RSS/(N-K)}$$

Where
ESS=Explain sum of squares
RSS=Residua1 sum of squares
N=Number of observations
K=Number of parameter.

Null hypothesis :$H_0:B_1=B_2=0$ All slope co-:-efficient are simultaneously zero.

Alternative hypothesis :H_1 Not all slope co-efficient are simultaneously zero.

$$\text{Therefore} \quad F=\frac{500440479.150/2}{22691720.850/47}$$
$$=518.266$$

The critical value of F at 5% level of significance with (2,47) degrees of freedom is 3.23
As the calculated F value exceed critical value .So we can reject null hypothesis.
Obviously the computed F value is highly significant because P-value is .000
So the co-efficient of income and family size is statistically significant.

Individual significancy test.

T (=t) test for B_1

$H_0:B_1=0$

$H_1:B_1\neq 0$

$$T(=t)=\frac{\hat{B}_1}{Se(\hat{B}_1}$$
$$=\frac{330.371}{308.435}$$
=l.07l

The critical value of t at 5% level of significance with 47 degrees of freedom is 2.021.
As the calculated t value does not exceed critical value. So we can not reject null hypothesis.Only 50% level of significance we can reject null hypothesis.

T (=t) test for B_2.

$H_0:B_2=0$

$H_1:B_2\neq 0$

$$T(=t)= \frac{\hat{B}}{Se(_{B2})}$$
$$= \frac{.669}{.022}$$
$$=30.625$$

Here critical t value at 5% level of significance is 2.02l.Which is less than calculated value. So we can reject null hypothesis.

For B_3 calculated t value is 2.037 which exceed critical value .So we can reject null hypothesis at 5% level.

On the basis of p- value we can say that $\bar{B}_2$ and $\bar{B}_3$ is highly significant.

Finally we can say that $\bar{B}_2$ and $\bar{B}_3$ is significant at 5% level but $\bar{B}_1$ is insignificant. $\bar{B}_1$ is significant only 50% level.

There fore our conclusion is that there is an important effect of family income and family size on consumption of the rural people at govindarkhil and fatika village. And there is a significant relationship a income and family size on consumption expenditure of the rural people above two village at Begumgonj Upazilla.

Model-2

We can get the following results after inclusion dummy variable

C=547.l25+. 700Y+l06.589N-236.525D_1-2l7.937D_2 +ll6.306D_3 +2l0.4l8D_4 +l95.l83D_5 -775.126D_6

(468.542) (.027) (60.711) (327.722) (252.027) (279.028) (236.999) (199.376) (244.225)

T(=t)=1.168, 26.360, 1.756, -.722, -.865, .471, .888, .979, -3.174

R^2 =.967 $\bar{R}^2$ =.96l 1 F=151.888 DW=l.986 df=4l

The intercept term indicates when all variables are zero then the family consumption is 547.125 taka. Here MPC is .7 which that if the family income increases 1 taka then the family consumption increases .7 taka.

If family member increases l then the family consumption increases l06.589 taka.

The dummy variable D_1 , D_2 and D_6 , are negatively related to the family consumption

On the other hand D_3 ,D_4 , and D_5, is positively related to the family consumption.

The model fits very well. The adjusted R^2 is .967 imply that more than 97% of the variation of the `consumption expenditure has been explained by the repressors of the model.

Co-efficient of abroad l 16.306 shows(all other factor constant) that the abroad family monthly consumption expenditure is expected to be higher ll6.306 taka than other people

The co-efficient of All other factor constant) that the family planning receiver family monthly consumption is expected to be higher 195.183 taka then the people who did not receive family planning .

Over all significancy text.

Calculated value of F=l5l.888.
The critical F value at 5% level of significance with (8,41) degrees of freedom is 2.l8
The calculated F value are can reject null hypothesis .On the
basis of p-value we can also reject null hypothesis.

Individual significancy test.

The critical value of t at 5% level of significance with 4l degrees of freedom is 2.02l.Here slope co-efficient α_2 and α_9 is statistically significant at 5% level α_3 is significant at l0% level.And 50% level all slope co-efficient is statistically significant exclude α_6.On the basis of p-value we can draw same conclusion.

All this results conclude that the consumption function has been specified correctly and appropriate estimation technique has been used.

(N B-At first per capita consumption function was estimated by using per capita income but then expected sign of co-efficient was not found.
Second time land was of the family but then the co- efficient of land was not found statistically significant. So of my honorable teacher suggestion I reject that two model)

ELEASTICITY ESTIMATES .

From the parameter estimates elasticity has been calculated with respect of each independent variable(By using computer program (‘SPSS’—l0.0l).

The elasticity of consumption with respect to family income was found .856. This magnitude of income elasticity consumption implies that l% increases in the family income family.854 (1% per month).On the other hand the elasticity of consumption with respect to family size was found .07022 .Which implies that if family member increases 1% then family consumption increases .0702

Elasticity indicates the percentage changes in dependent variable for a percentage change in independent variable.
ln the general conclusion we can say that there is a positive relationship between family income and family consumption.

DUMMY INTERACTION EFFECT

For slope changes

$C=\alpha_1+\alpha_2 Y+\alpha_3 N+\alpha_4 D_1+\alpha_5 D_2+\alpha_7 D_4+\alpha_8 D_5+\alpha_9 D_6+\lambda YD_3+V$

Assume E(v)=0

$C=866.539+.879Y+55.466N-481.899D_1-283.268D_2-248.285D_4+83.787D_5-711.608D_6-.168YD_3$

E(C/ D_1=D_2 =D_4 =D_5 =D_6 =0 D_3 =l,Y,N) Expected consumption of the abroad family.
=866.589+.879Y-.1e8Y+55.466N
866.539+.71lY+55.466N

The co-efficient of income decreases from .879 to .71 l .That means MPC of abroad family decreases. The slope of abroad family is different.

lt is statistically significant because calculated t is l5.876 and p-value is .000.
It is economically meaningful because MPC decreases if income increase and MPC of the rich family is lower than poor people.
We can conclude that MPC & MPS of the abroad family is different and their slope is also different.

FOR SLOPE AND INTERCEPT CHANGES

$C=\alpha_1+\alpha_2 Y+\alpha_3 N+\alpha_4 D_1+\alpha_5 D_2+\alpha_6 D_3+\alpha_7 D_4+\alpha_8 D_5+\alpha_9 D_6+\lambda YD_3+V$
Assume E(v)=0
E(C/ D_1=D_2 =D_4 =D_5 =D_6 =0 D_3 =l,Y,N) Expected consumption of the abroad family.
=478.875+.995Y+6.835N-312.346 D_1-143.076 D_2 +l 177.844 D_3-137.861 D_4
-48.l00l D_5-855.714 D_6-.322Y D_3.
=478.875+.995Y-.322Y+6.835N+l177.844
=l656.3l9+.673Y+6.835N

We can see that the slope and intercept term of abroad family is different. And this differential slope and intercept are statistically significant and economically meaningful.

We can see the intercept term(autonomous consumption) of abroad family is higher than other family. On the hand the slope(MPC) of abroad family is lower than other family. Because if income increases of the people then MPC decreases and MPC of the rich people is lower than poor people .It is Economically meaningful.

AUTO Or SERIAL CORRELATION TEST

There are following method to detect autocorrelation.

l.Graphical method.
2.The runtest.
3.Durbin-Watson test.
4.Breusch-Godfrey test.

The most celebrated test for detecting serial correlation is Durbin-Watson.lt is more formal and widely use than any other test. It is popularly known as the Durbin-Watson d-statistics.

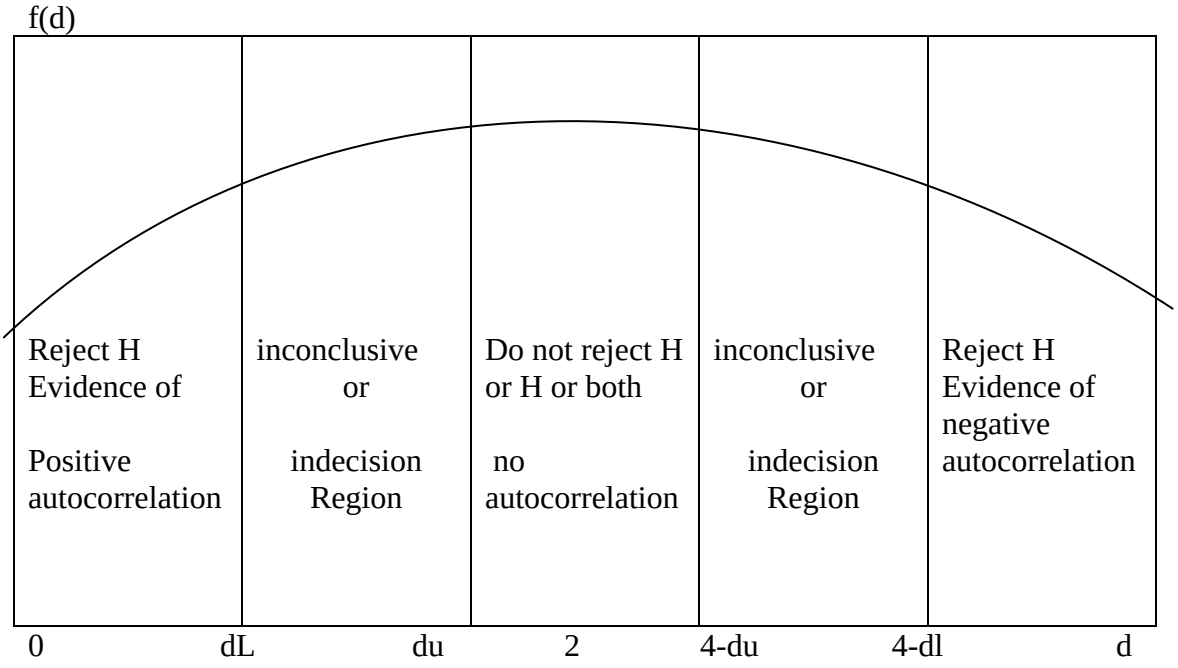
H_0 :No positive autocorrelation.

H_0 :No negative autocorrelation.

d_L =Lower limit of Durbin- Watson.

dU =Upper limit of Durbin-Watson.

The testing procedure is as follow ·



Model-l (5% level)						
0	1.462	1.628	1.927	2.372	2.538	4
(1% level)						
0	1.285	1.446	1.927	2.664	2.716	4
Model-2 (5% level)						
0	1.201	1.990	1.906	2.07	2.799	4
(1% level)						
0	1.039	1.748	1.986	2.252	2.961	4

Durbin-Watson d test: decision rule.

null hypothesis.	decision rule.	If
No auto correlation No positive auto correlation No negative auto correlation No negative auto correlation No auto correlation positive or negative	Reject . No- decision Reject . No decision. Do not reject.	O<d < d dL ≤ d≤ du 4-dL< d<4 4-du≤ d≤4-dL du<d<4-du

Durbin-Watson d test:decision rue

Modle-l

In model -1 sample size is 50 K=2 at 5% level of significance d_L =l.462 and dU =1.628.

And at 1% level of significance d_L =l .285 and dU =l.446

Computed d value is l.927

Since "dU<d < 4-dU" both 5% and 1% level [5% level : l.628<l.927<2.372 and 1% level (l.446<l .927<2.554) so we can not reject null hypothesis no auto correlation positive or negative.

Finally we accept null hypothesis and say that there is no auto correlation (positive or negative) in this model.

[

Model-2

ln model-2 sample size 50 and k=8 At 5% level of significance dL=l.20l and dU=l.930 And 1% level dL=l .039 and dU=l .748

The computed d value is 1.986

Since " dU<d < 4-dU" both 5% and 1% level [5% level l.930<1.986<2.07 and 1% level (1 .748<1 .9S6<2.252) so we can not reject null hypothesis no auto correlation positive or negative.

ln the general conclusion we can say that both model is free from autocorrelation.

Multi collinearity test

There are following rule of thumb to detect multi collinearity.

1.High R^2 but few significant t ratio.
2.High pair-wise correlation among repressors.
3.Examination of partial correlations.
4.Auxi1iary regressions.
5.Eigne values and condition index.
6.Tolerence and variance inflation factor.

For model-1

With the help of eigne value

If lt is between 100 to 1000 there is moderate to strong multicollinearity.

lf k exceeds 1000 there is multicollinearity. `

lf k is less then 100 there is low multicollinearity.

$$K=\frac{MaximumEignevalue}{MinimumEignevalue}$$
$$=\frac{2.581}{.05196}$$
$$=49.67$$

lt indicates that there is not serious Multicollinearity problem.

Condition index:

lf condition index(Cl) is between 10 to 30 then there is moderate to strong Multicollinearity If it exceed 30 then there is severe multicollinearity.

$$CI=\sqrt{k}$$
$$=7.078$$

Condition index shows there is not multicollinearity problem.

Variance inflation factor (VIF)

If the VIF of a variable exceeds l0 (This will happen if R exceeds .90) then that variablé is said to he highly collinear. In our model VIF was found 1.065 which not exceed l0 .So according to the VPF we can say that multicollinearity is not serious problem in the model.

Tolerance:

Tolerance as a detection of multi collinearitylt is defined as:

$$Tol=1-R^{2}_{J}$$
$$=\frac{1}{VIF_J}$$

Clearly Tol_j =l if x_j is not correlated with the other repressors.

If Tol_j =0 then x_j perfectly colinear to the other repressor

lf Tol value is tends l to 0 then low to high multicollinearity.

In this model we found Tollerance value .939 which indicates there is not serious multicollinearity problem.

The results of model-2 is nearly model one. Now we can conclude consider all these rule of thumb there is not serious multicollinearity problem in our model.

HETRERoSCEDASTICITY TEST

There are following method to detect Heteroscedasticity.

1.Graphical method.
2.Park test.
3.Glejser test.

4.Spearmans rank correlation test.
5.Goldfeld-Quandt test.
6.Breusch-pagan-Godfrey test.
7.White general heteroscedasticity test.

For Y

First let Y is responsible for heteroscedasticity. Then record the observations into ascending Y omit 6 central observations and divide the remaining 44 observations into two groups each group containing 22 observation.Then run the usual OLS regression on each group separately .

We obtion the following result .

For Ist 22 observations

C=297.234+.844Y

(247.455) (.117)

r^2 =.722 RSS_1 =793350.094

df=20

For last 22 observation.

C=1417.647+.642Y

(340.032) (.036)

r^2 =.94 RSS_2 =19655686.275

df=20

$$\text{Thus } \lambda = \frac{RSS/df}{ESS/df}$$

$$= \frac{19655686275/20}{793350.094/20}$$

=24.7756

The critical F value for (20,20) degrees of freedom at 5% level is 2.12. Since the estimated F(= λ) value exceed the critical value we may conclude that there is heteroscedasticity in the errorvariance.

For N .

Now let N is responsible for heteroscedasticity .Then we have get the following result .

For the first 22 observation

C==18.919+79l.892N

(1018.662) (287.299)

r^2 =.275 RSS_1 = 22257297.297

df =20

For the last 22 observation.

C=5272.l85-5l.325N

(5437.292) (830.057)

r^2 =.0O0l9 RSS_2 =37832O860.927
df =20

$$\text{Thus } \lambda = \frac{RSS_{2/df}}{RSS_1/df}$$

$$\frac{378320860.927/20}{22257297.297/20}$$

=l6.9948

The critical F value for (20,20) degrees of freedom at 5% level is 2. l2-since the estimated F(= λ) value exceeds the conclude that there is heteroscedasticity in the error variance.

Remedial measures of heteroscedasticity

There are two approaches of remove heteroscedasticity.

l.When σ^2 is known.
2.When σ^2 is not known.

When σ^2 is known then weighted least square (WLS) method use to remove heteroscedasticity. But in this model σ^2 is not known so WLS method is not applicable in this model.
When σ^2 is not known then we can consider several assumption about the pattern of heteroscedasticity.

Assumption-l
The error variance is proportional to Y^2_i .

$E(U^2_i)= \sigma^2 Y^2_i$

Assumption2
The error variance is proportional to Y_i

$E(U^2_i)= \sigma^2 Y^2_i$

Assumption-3
The error variance is proportional to the square of the mean value of C
$E(U^2 i)= \sigma^2 [E(Ci)]^2$

Assumption-4
A Log transformation such as.

$LnC= B_1 + B_2 LnY+B_3 LnN+U$

Very often reduces heteroscedasticity when compared with the regression.
Here we follow assumption-4o remove heteroscedasticity.According to assumption -4 we get the following result.

Lnc= 1.018+.854LnY+.7022LnN
(.215) .(029) (.051)

T(=t)=4.731 2_9.875 1.390

R^2 =.959 R^2 =.957 f=549

df`=47

Here adjusted $\bar{R}^2$ indicates that the model fitted very well t ratios is highly significant excluding one F value is also highly significant. Here consumption elasticity of income was found .854. And the elasticity of consumption with respect to family size was found .07022

Examination of removing heteroscedasticity

For Y

For lst 22 observations

LnC=l.067+.858LnY

(.868) (.114)

r^2 =.74O RSS_1 =.l7l

df=20

For last 22 observations

LnC=l.370+.828Y

(.498) (.057)

r^2 =.913 RSS_2 =.475

df=20

$$\text{Thus } \lambda = \frac{RSS_{2/df}}{RSS_1/df}$$

$$= \frac{.475/20.}{.171/20}$$

=2.78

The critical F value for (20,20) degrees of freedom at the 1% level is 2.94.Since the estimated F(= λ) value do not we can conclude that there is no heteroscedasticity in the error variance.

For N

For lst 22 observations

LnC=7.008+.63l LnN

(.363) (.238)

r^2 =.260 RSS_1 =3.86l

df=20

for the last 22 observations

LnC=7.43l+.472LnN

(.662) (.409)

r^2 =.062 RSS_2 =8.478

df=20

$$\text{Thus } \lambda = \frac{RSS_{2/df}}{RSS_1/df}$$

$$= \frac{8.478/20}{3.861/20}$$

$$= 2.196$$

The critical F value for (20,20) degrees of freedom at l% level of significance is 2.94. Since the estimated F(= λ) value do not exceeds the critical value we can conclude that there is no heteroscedasticity in the error variance.

Finally in the general conclusion we can say that we can not find auto correlation and multicallinearity problem in our model .We can only find heteroscedasticity problem in the model because it is was found in the primary data . To remove heteroscedasticity problem we follow assumption -4 and successfully remove heteroscedasticity problem.

Summery and conclusion

Bangladesh is least developed country. About 80% people live in the village. So the Study of factor effecting an estimation of the consumption pattern of the rural people is most important of our country.
In model -1 MPC was found .669 so the MPS is (l-MPC)=(l-.669)=.33l
That means if one taka increases family income then the family consumption increases .66 taka. And save .331 taka.

And the multiplier is
Which indicates that if Government expenditure increases 1 core taka then national income increases 3.02 core taka.
lt is likely same for model -2.
The aim of the study is that the income response of consumption in rural people. The model has been estimated area. ln order to determine the appropriate estimation technique the empirical model was estimated OLS method.
Particularly the test of serial correlation, multicollinearity and heteroscedasticitry were made. And finally remove heteroscedasticity by using assumption -4 .

All variable of the model have expected sign and were found highly significant . Income elasticity of consumption was found .84
And family size elasticity of consumption was found .07022 . 95% confidence interval for MPC was found .625 to .713 for model -1 . The result of the model -2 is likely same .
I think this study will be well representative of any other rural people of the country. The finding of this study will be useful to the policy makers of the government.

Biglography

l.Basic Econometrics--- ---- ---Damodar N Gujarati.
2.Elements of Econometrics-----Jan-Kmenta.
3.Econometrics method --------- J.Jahnston.
4.Macro Economics theory and policy – William.H.Branson.
5.Macro Economics ----------Rudiger-Dorn-Bush-Fisher