

GST and Consumption Function in India

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ABSTRACT

GST is the synonyms of the Indirect Tax and share of indirect tax is much more than the direct tax revenue collection in India. However, It is observed that less tax would be levied as compare to earlier taxation (i.e. VAT). Since GST is the commodity taxation, directly impact on the consumption pattern. Therefore, the main objective of this paper to establish the consumption function after introduction of LPG policy, i.e. 1991-92 to 2016-17 with the help of co-integration and ECM (Error Correction Mechanism). It is found that long run equilibrium marginal propensity to consume is 0.836 while the short run equilibrium marginal propensity to consume is 0.659.

1. Introduction

Any taxation process, the policy maker would make attention about equity and efficiency tax structure. By this proposition, time to time tax reforms occurred in any economy. In this context, Government of India had launched new tax system in July 1, 2017, under the 122th Amendment of the Constitution of India, in place of indirect taxation or commodity taxation namely, Goods and Service Tax (GST). It is a consumption based tax. India adopted a dual GST model; implying taxation is collected by Union or Centre (as CGST, centre Goods and Service Tax) and State (as SGST, State Goods and Service Tax) as well as IGST (Integrated Goods and Service tax). In lieu of former several taxes such as, central excise duty, service tax, additional custom duty, surcharges, state level value added taxes and octroi; a single GST system is replaced. However GST is levied on all transactions like sale, transfer, purchase, barter, lease or imports of goods or services. Under the GST system, Goods and Services are taxed at the following rates; 0 percent, 5 percent, 12 percent, 18 percent and 28 percent. Due to the infant stage of the taxation, GST tax has reduced from 28 percent to 18 percent of 178 goods and services during the 23th GST council meeting in Guwahati on Nov.10, 2017.

However, various sources of collecting revenues by the government are tax revenue, non-tax revenue, grant-in-aid and

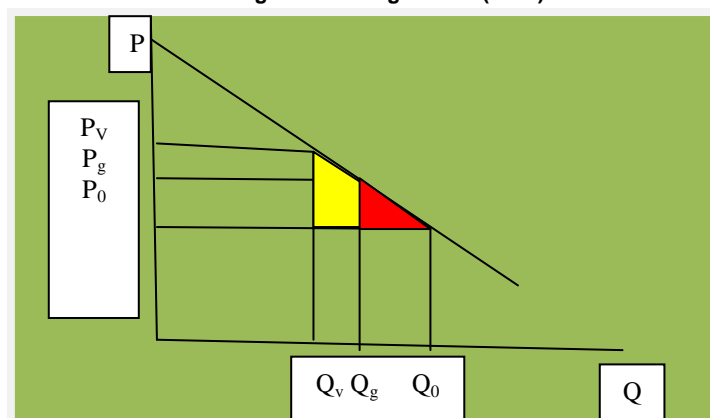
public debt so that government discharges the responsibilities. Musgrave and Musgrave (1989) express the quality of tax structure should follow the equity and efficient so that the distribution of tax burden is equitable as well as minimize the excess burden.

As per the Indian Public Finance Statistics 2016-17, the share of direct and indirect tax in total revenue in India is more than 60 percent tax account for indirect tax since 2000-0. Since, GST is the synonyms of indirect tax revenue. The economic rationale of levying taxes is to bring optimum and efficient resource allocation within the economy so as to it helps to accelerate the rate of savings and investment, to reduce inequalities in income, wealth and to promote consumption or employment opportunities in the economy. So the objective of this paper is to define how the consumption function would be during 1991-92 to 2016-17 (i.e. after introducing the LPG policy).

2. Role of GST on Consumption Function in India

Ramsey (1927) firstly formulated the problem of optimum taxation by asking a question how government should set its tax rates across a set of commodities so as to minimize the dead weight loss or excess burden or efficiency loss (DWL) of the tax system. That DWL reduces the consumer surplus.

Fig.1 Dead Weight Loss (DWL)



Thus DWL is defined from the Fig.1. Assume that a commodity taxation i.e VAT tax, 't' is levied on an item and price increases to P_v (due to VAT tax). The whole shaded triangle area is known as DWL. However due to the GST, price of that item is slightly decreased and hence DWL is in red shaded area which lowers the welfare loss with respect to VAT. Thus DWL is defined (Stiglitz, 2000 and Hindriks & Miles, 2006) as:

$DWL = \frac{1}{2} t dQ$, here dQ is the change in quantity demanded from Q_0 to Q_v

Now **elasticity of demand** is defined as $E = \frac{dQ}{dP} * \frac{P_0}{Q_0}$

Here dP = Change in Price from P_0 to P_v ; P_0 and Q_0 are the initial price and initial quantity of that item. By putting the value of dQ from the equation of elasticity of demand, the DWL becomes:

$$DWL = \frac{1}{2} t^2 E \frac{Q_0}{P_0}$$

The implication of the DWL is the directly proportion of the square of tax and elasticity of demand provided the initial quantity Q_0 and initial price P_0 .

By the Marshallian approach, if demand is perfectly elastic and supply is perfectly inelastic, the tax burden or DWL is zero. On the other hand, by Hicksian approach, the policy and economic situation which caused a 'distortion' in relative prices will have an income effect and that income effect is a 'DWL' (Hindricks and Miles, 2006).

Hence, the tax by VAT (earlier tax structure in India) is in Geometric Progression while through GST it is in Arithmetic Progression, it is due the strong input credit. As per mathematics, total sum in Geometric Progression is larger than the sum of Arithmetic Progression. This implies commodity or item is costly during VAT regime compare to GST regime. Owing to the less commodity taxation (by GST), it improves the quantity demanded so as to increase the employability of the economy and thus improve the economic growth (Kumar.A 2017)¹.

3. Research Methodology

In this paper, the major objective is to establish the consumption function from 1991-92 to 2016-17, when Indian economy had introduced the LPG (Liberalisation, Privatisation and Globalisation) Policy. In this regard, per capita consumption expenditure and per capita disposable income has been taken into consideration as variables or factors for determining the consumption function. There are various ways for estimating function:

Step.1 These variables i.e. per capita consumption expenditure and per capita disposable income, are converted into per 1000 population and denoted as C and Y.

Step.2 For stationary, C and Y has tested by applying Dickey Fuller Test of Unit Root.

Step.3 If these variables are non stationary, then apply co-integration process for defining consumption function.

3.1 Co-integration between C and Y

If a non stationary time series regressed with another non stationary time series, provide a 'spurious regression' [Gujarati, 2012]. For shorting out from this spurious regression, co-integration process would be applied.

$$C_t = \beta_1 + \beta_2 Y_t + u_t$$

[Here, C_t and Y_t are non-stationary at $I(0)$

i.e. $u_t = C_t - \beta_1 - \beta_2 Y_t$

If u_t is stationary, then this consumption function gives meaningful result. In this case it is said that these two variables are to be co-integrated and β_2 is co-integrating parameter. This relation leads to the 'long run' equilibrium between C and Y.

3.1.1 Testing of Co-integration

There are two tests applied for testing co-integration, one is EG (Engle-Granger) test and another is CRDW (Co-integrating Regression Durbin Watson) test. Any one if justified for integration. In this paper EG test is taken into consideration for co-integration test.

• **Engle – Granger (EG) test: This test:** This test follows the following steps:

Step.1 first regress Y_t on C_t ; i.e. $C_t = \beta_1 + \beta_2 Y_t$

Step.2 Find out the residual term (u_t) and check the stationarity by applying unit root test

Step.3 for unit root test,

$$\Delta u_t = \rho u_{t-1}$$

If this u_{t-1} is $I(0)$, this means it is stationary, that implies the regression is free from spurious regression but it is cointegrated function. Then this β_2 from the consumption function is known as 'static' or 'long run' equilibrium MPC (Marginal Propensity to Consume).

3.1.2 Co-integration and Error Correction Mechanism

In the above discussion, the long-run equilibrium relationship between C_t and Y_t . Then a question is raised about the 'short run' equilibrium relationship. This equilibrium would be established with the help of ECM (Error Correction Mechanism) [Sargan, 1983]. Consider,

$$\Delta C_t = \alpha_0 + \alpha_1 \Delta Y_t + \alpha_2 u_{t-1} + \varepsilon_t$$

- If ΔY_t is zero and u_{t-1} is positive, this means C_t is too high to be in equilibrium i.e. C_t is above its equilibrium value.
- If α_2 is expected to be negative, the term $\alpha_2 u_{t-1}$ is negative and ΔC_t will be declining towards equilibrium level. That means C_t is above its equilibrium level and it will start declining in the next period so that it will correct equilibrium error. This process is known as ECM.

¹ Kumar.A (2017), presented in the UGC Sponsored International Seminar, Deptt. Of Economics, LNMU, Darbhanga in titled 'Impact of GST on Economic Growth in India.

- If $\alpha_2 u_{t-1}$ is positive, this leads to C_t will be rising in the next from the equilibrium level.

Hence, the value of α_2 decides how quickly the equilibrium is restored and α_1 is known as 'short run' equilibrium MPC, if it is statistically significant.

4. Empirical Analysis

For the sake of finding consumption function during 1991-92 to 2016-17, checking the stationarity condition of the two variables (C_t and Y_t)

Table.1 Dickey Fuller Test of C_t and Y_t

Variables	τ value	P value
C_t	-0.405	0.9093
Y_t	-0.063	0.9943

(τ value indicates coefficient of Dickey Fuller test and p value indicates their significance status.)

From the above table.1 it is clearly observed that both the variables are non stationary at $I(0)$.

4.1 Cointegration between C_t and Y_t

If a non stationary time series regressed with another non stationary time series, provide a 'spurious regression'. For the sake of eliminating this spurious regression, cointegration plays significant role.

Consumption function after 1991-92

$$C_t = 0.567 + 0.836 Y_t$$

$$t = (0.739) \quad (55.25)$$

$$p = (0.467) \quad (0.000)$$

$$R^2 = 0.992, F = 3052.8 \quad (0.000)$$

If this estimated equation scales spurious regression until its residual term (u_t) could not be stationary. Again for the stationary, unit root test is applied with the help of Dickey Fuller

test, the τ value of u_t is -2.290 which is significant at 1 percent level of significance. This means that u_t is stationary.

Therefore, the co-efficient value of Y_t , which is known as long run equilibrium marginal propensity to consume (MPC), is also statistically significant. Thus, 0.836 gives the long run equilibrium MPC.

4.2 Co-integration and Error Correction Mechanism (ECM)

For the sake of short run equilibrium MPC is defined, following estimation is needed.

$$\Delta C_t = 0.904 + 0.659 \Delta Y_t - 0.505 u_{t-1}$$

$$t = (1.58) \quad (7.25) \quad (2.24)$$

$$p = (0.13) \quad (0.000) \quad (0.035)$$

$$R^2 = 0.745 \quad F = 35.5 \quad (0.000)$$

Since, co-efficient of u_{t-1} shows the negative and significant at 5 percent level of significance. This implies the short-run equilibrium MPC will be declining and restore at the equilibrium level. Thus the short run equilibrium MPC is 0.659 which is also statistically significant.

5. Conclusion

GST has launched on July 1, 2017 as the synonyms of the Indirect Tax in India and share of indirect tax is much more than the direct tax revenue collection in India. Although, It is observed that less tax would be levied as compare to earlier taxation (i.e. VAT). Since GST is the commodity taxation, directly impact on the consumption pattern. So the main objective of this paper to establish the consumption function after introduction of LPG policy, i.e. 1991-92 to 2016-17 with the help of co-integration and ECM (Error Correction Mechanism). It is found that long run equilibrium marginal propensity to consume is 0.836 while the short run equilibrium marginal propensity to consume is 0.659.

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