

Econometric Analysis of Price Shock and Consumption Demand of Sugar in Pakistan

Author's Details

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Abstract:

The main objective this research study to estimate the price elasticity, price shock and consumption demand of sugar in Pakistan. Time series data from 1990-2013 were taken from various secondary sources, the data series is stationary if its mean ($E(x_t)$) and variance ($V(x_t)$) are constant over the time of the covariance. The small way to estimates testing of order integration is to performed the Augmented Dickey Fuller (ADF) tests for unit root Data were analyzed by using E-Views-7. The regression Model was used Consumption of Sugar as a dependent variables includes price and shocks. Explanatory variable price changes and shocks and price substitute. It was revealed that Political involvement and government irregularities were responsible for the huge price shocks. It was further revealed that sugar industry prices were not stable always-increasing trend. Sugar industry has monopoly in Pakistan.

Key Words: Econometric, Price Shocks, Consumption, Sugar.

Introduction:

Sugar Industry in Pakistan

The sugar industry plays an important role in the economy of the country. After textile industry Sugar is the second place in the GDP of Pakistan. Sugar industry in terms of size is equal to the cement sector. (Economic Survey of Pakistan). Sugar is not only consumed direct by the consumer but it also used in making various products like, sugar beverages, chipboard, paper, confectionery and provides raw materials. Sugar prices always volatile and not stabilized in many years. Sugar prices always increases in Pakistan because there is no particular substitute of Sugar.

Table-1: Area, Production and Yield of Sugarcane

Year	Area		Production		Yield	
	(000 Hectare)	% Change	(000 Bales)	% Change	(Kgs/Hec)	% Change
2009-10	943	–	49,373	–	52,357	–
2010-11	988	4.8	55,309	12	55,981	6.9
2011-12	1,058	7.1	58,397	5.6	55,196	-1.4
2012-13	1,129	6.7	63,750	9.2	56,466	2.3
2013-14	1,173	3.9	66,469	4.3	56,666	0.4

Source: Pakistan Bureau of Statistics

P:provisional (July-March)

Literature Review

Prices of food increased in the developing countries like Pakistan. (Esterly and Fischer,2001) argue that inflation leaves poor worst off specially in developing countries. (Khan et al.,2007) argues that there is big among rich and poor in developing countries. Government is collecting public revenue in terms taxes and that revenue should invest on the welfare of the people (Sharief.et al.2000).

(Cullum and Pissarides, 2004). Given the changes in the market since then, it was felt that this issue required revisiting. We use quarterly time-series data to pursue an Engle- Granger two step co- integration procedure. According to the above research he estimates various parameters that are responsible for the price shock and author focus on the tobacco price

shocks in the United Kind. (Chaloupka and Warner, 2000), he argues that when inelastic demand of and commodity there prices always changed due to demand always there.

(Becker and Murphy, 1988). He argues that not only consumption creates demand for necessarily goods but also consumption pattern of that particular product leads to price changes. Furthermore, this distinction is increasing in the level of consumption.

Econometric Estimations Gallet and List (2003) have conducted an extensive metaanalysis to examine the differences across literature. The elasticity for using sugar among teenagers and kids are higher than the baseline whilst that for adults tends to be more inelastic. There is also some evidence that the participation elasticity is more elastic for younger smokers (Lewit et al, 1981, Chaloupka and Grossman, 1996). One explanation behind the discrepancy might be that adults are more addicted than younger smokers, so less likely to either reduce consumption or quit. Another explanation is that tobacco makes up a much higher proportion of a younger person's total expenditure than that of an older person (ONS, 2009). In that case we would expect consumption to be more price elastic. Compared to the baseline, demand by women is more inelastic whilst that for men is not significantly different to the baseline.

, Farrelly et al (2004) show how some smokers respond to tax increases by switching to cigarettes with higher tar and nicotine content. Whilst these findings are interesting from a health perspective, they are less relevant to the question of tax revenue.

According to classical view point inflation is everywhere in developed as well under developed world (Friedman et al., 1970). Bhattacharya and Iodhi (1990) he applied structural approach specification with error correction in model design. A recent work done by (Hassan et al., 2005) view point the Whole sale price index (WPI) and CPI index in Pakistan is not stable for the whole year.

Methodology

Time series data were collected from 1990-2014 from various secondary sources, the data series is stationary if its mean (E_{x_i}) and variance (X_t) are constant over the time of the covariance. The small way to estimate testing of order integration is to perform the Augmented Dickey Fuller (ADF) tests for unit root. This test based on the difference of the past value.

$$\Delta y_t = \delta y_t - y_{t-1} + \sum \delta_i \Delta y_{t-i} + \eta_t$$

Y = tested Variable

Explanatory Variable

Number of explanatory variables were considered, like total household consumption of Sugar, sales duty. The whole sale Price index (WPI) and Consumer Price Index (CPI) and also difference calculated from them. Dummy variable was included in the model because in 1998. Since data is yearly so yearly dummies were placed to prevent loss of information.

Results

Table-2-Variables

Variable	Description	Source
Price	Weighted Average Price	Pakistan Statistics Division Islamabad
Expenditure	Consumption Expenditure on Sugar	Pakistan Statistics Division Islamabad
Volume	Total yearly consumption of Sugar	Pakistan Statistics Division Islamabad
WPI	Whole sale price Index	Pakistan Statistics Division Islamabad
CPI	Consumer Price Index	Pakistan Statistics Division Islamabad
DIF	Difference	Self-generated

Dummy= 1998

Table-3-Augmented Dickey Fuller Test Results**Augmented Dickey Fuller Test Results for the final choice of variables**

ADF Test Specification				Stationary Results	
Variable	lags	Trend	Intercept	ADF	Order of integration
Price	8	Yes	Yes	-2.11	1(1)
Expenditure	8	Yes	Yes	-2.09	1(1)
Volume	8	Yes	Yes	-2.70	1(1)
WPI	8	Yes	Yes	-2.55	1(1)
CPI	8	Yes	Yes	-2.66	1(1)
DIF	8	Yes	Yes	-0.09	1(1)

Data mining can not be based on general or specific approach to be performed because variables are not stationary. So long run and short run Elasticities should be analyzed according the variables. The choice of the final model is interpret results of the co-integration test.

Dependent Variable

Volume

Explanatory Variables

Price	Price	Price	Price
Expenditure	Expenditure	Expenditure	Expenditure
WPI	WPI	WPI	WPI
CPI	CPI	CPI	CPI
Trend	Trend	Trend	Trend

Functional Period 1990-2014

Sugar prices always inelastic demand because there is no perfect substitution of sugar, Sugar consumption depends upon the household size and consumption pattern. In Model-1 taken from consumer demand, In Model 2 CPI average taken from index. According to the residual plots from two long run relationship estimated both linear and log linear demand specification and two chosen two time period.

Table-

Long Run Result	Model 1		Model 1a		Model 2		Model 2a	
Time Period	1990-2014		1990-2014		1990-2014		1984q4-2009q4	
Specification	Linear	Semi-Log	Linear	Semi-Log	Linear	Semi-Log	Linear	Semi-Log
<i>Price</i>	-22.427	-0.065	-22.374	-0.065	-21.967	-0.059	-21.507	-0.058
	0.873	0.003	0.879	0.003	1.322	0.005	1.334	0.005
<i>Volume</i>	0.305	0.001	0.307	0.001	0.291	0.001	0.276	0.001
	0.054	0.000	0.055	0.000	0.067	0.000	0.068	0.000
<i>Expenditure</i>	0.006	0.000	0.007	0.000	0.002	0.000	0.003	0.000
	0.009	0.000	0.009	0.000	0.009	0.000	0.009	0.000
					17.323	0.128	23.858	0.142
					16.423	0.057	16.556	0.059
<i>WPI</i>	0.000	0.000	0.000	0.000				
	0.000	0.000	0.000	0.000				
<i>CPI</i>	-0.867	-0.003	-0.884	-0.003	-1.028	-0.004	-1.086	-0.004
	0.176	0.001	0.176	0.001	0.195	0.001	0.195	0.001
							-14.512	-0.070
							3.668	0.013
<i>Q1</i>	-3.214	0.006	-2.408	0.007	-2.600	0.007	-1.739	0.009
	2.901	0.010	2.970	0.011	2.904	0.010	2.951	0.011
<i>Q2</i>	7.795	0.036	9.041	0.039	3.502	0.020	4.472	0.022
	3.364	0.012	3.473	0.013	2.594	0.009	2.631	0.009
<i>Q3</i>	11.704	0.042	12.414	0.045	2.890	0.013	3.175	0.014
	5.192	0.018	5.414	0.020	1.952	0.007	2.001	0.007
<i>Constant</i>	729.618	6.678	710.956	6.683	724.212	6.643	704.296	6.644
	30.312	0.108	31.567	0.116	30.920	0.108	32.109	0.115
<i>Dummy 1998</i>	-15.454	0.010			-15.038	0.010		
	3.137	0.011			3.161	0.011		
							3.039	0.011

4. Long run Elasticities Results

According to the above results Total expenditure treated as a proxy for income but estimated coefficient, there is big difference in the CPI and WPI because of the monopoly of the wholesalers. The consumption demand volume is quite large. The effect of linear time trend relatively strong. There is no perfect substitute of sugar in the Pakistani Market. Various approaches used to calculate Elasticities at the mean values. Elasticities from the short run error correction model.

Table-5-Estimation of Elasticities

MODEL 1		MODEL 1 A		MODEL-2		MODEL 2A	
Linear	Semi Log	Linear	Semi Log	Linear	Semi Log	Linear	Semi Log
Long Run Equilibrium							
-0.77	-1.55	-0.80	-1.18	-0.88	-1.77	-0.84	-1.60
Short Run Equilibrium							
-0.61	-0.41	-0.59	-0.42	-0.69	-0.51	-0.66	-0.47

Compare both models Long run and short run, long run produced high price Elasticities in absolute terms. Eight specifications estimated according to the results own price Elasticities range between 0.88 to 1.77. Model 2 performed marginally the best compare to other models and their results are more stable compare others.

Conclusion

The main aim of the current research to estimate the price shocks of sugar in Pakistan. Sugar prices are hiked due to the political economy of sugar in Pakistan. Most of the previous as well as this government are not taken any action about sugar mill owners rather supporting them. Our econometric model suggests that Sugar prices should be stabilized through strong price mechanism. Sugar prices always inelastic demand because there is no perfect substitution of sugar, Sugar consumption depends upon the household size and consumption pattern. In Model-1 taken from consumer demand, In Model 2 CPI average taken from index. According the variation in the sugar prices time to time it indicates that policy formulation institute are not free to fixed prices of sugar in Pakistan.

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