Edible Oil Deficit and Its Impact on Food Expenditure in Pakistan

Ali, Muhammad and Arifullah, Syed and Memon, Manzoor Hussain

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Muhammad Ali*, Manzoor Hussain Memon** and Syed Arifullah***

Abstract

This study is an attempt to analyze the impact of Edible Oil Deficit on Food Expenditure in Pakistan for the period 1971-2008. Edible oil deficit is one of the major concerns for the policy makers in Pakistan. Despite of having agriculture based economy; Pakistan is unable to fulfil her domestic demand of edible oil by local production. This situation forces the government to import edible oil and oil seeds from other countries. This import not only increases our balance of payment deficit but also it negatively affects the ability to finance the external debt repayments.

Autoregressive Distributed Lag model has been used to analyse the long run relationship amongst the variables. Other important determinants of food expenditure along with edible oil deficit were also used to check for their collective long run impact. It was found that long run negative relationship exists between edible oil deficit and food expenditure and hence the result derives the policy implication that there is a need to boost up the efforts in the agriculture sector to steadily increase the local production of oil seeds in the country. The relationship between the per capita GDP and food expenditure is found to be positive and significant with elasticity of 0.261 suggesting that 1 percent increase in per capita GDP will cause food expenditure to increase by 0.26 percent. The relationship between food subsidy and food expenditure is found to be insignificant suggesting that due to improper targeting and consumer's perception about quality and accessibility of subsidized food, Government's food support programs are not effective.

Keywords: Edible Oil, Production, Imports, Trade Deficit, Balance of Payments, International Trade, Oilseed Crops, Agriculture, Pakistan, Edible oil deficit, demand function, food, inflation, food inflation, household expenditure.

JEL: I31, Q18, Q11, E23, D20, E00

Authors are M.Phil Students, (Applied Economics) at Applied Economics Research Centre (AERC), University of Karachi, Karachi

* Muhammad Ali: alionline83@yahoo.com , ** Manzoor H. Memon: manzoorhmemon@yahoo.com

*** Syed Arifullah: s.arifullah@yahoo,.com

Introduction

Pakistan, a developing country, is the sixth most populous in the world (U.S.Census 2008), whose demand is rising due to steady economic growth. Agriculture contributes 23 percent of the GDP, 42 percent of the total work force is employed to the agriculture sector and also contributes substantially to Pakistan's export earnings (Alam 2008). Agriculture Commodities and Textiles Products accounts for 62.6% of Pakistan's total exports. (Memon, 2008). Pakistan is the ninth largest producer of wheat, 12th largest producer of rice, 5th largest producer of sugarcane and 4rth largest producer of cotton among the top producers in the world as per statistics of FY05 (Memon *et al* 2008).

Despite overwhelmingly an agrarian economy, Pakistan is unable to produce edible oil sufficient for domestic requirements. Edible oil is considered a necessity in Pakistan and hence its demand is relatively inelastic. There are many reasons behind this shortcoming, for example, lack of awareness of farmers, ignorance of policy makers regarding oilseed crops, technological deficiency in oilseed production and smuggling to neighboring countries (Afghanistan in particular). The major crop responsible for 57 % of edible oil production is cotton seed which is primarily a fiber crop.

Indigenous production of edible oil is below the consumption levels with a very wide gap between the production and consumption. This gap is bridged through import of edible oil worth more than Rs. 45.0 billion[1] annually. Presently the oilseed production only meet about 30%[2] of the domestic requirements and the rest is covered with imports. The high dependency on imports not only exerts the pressure on balance of payment but also develops a close linkage between international price

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[1] Author’s Estimates based on data from Agricultural Statistics of Pakistan
[2] Ibid

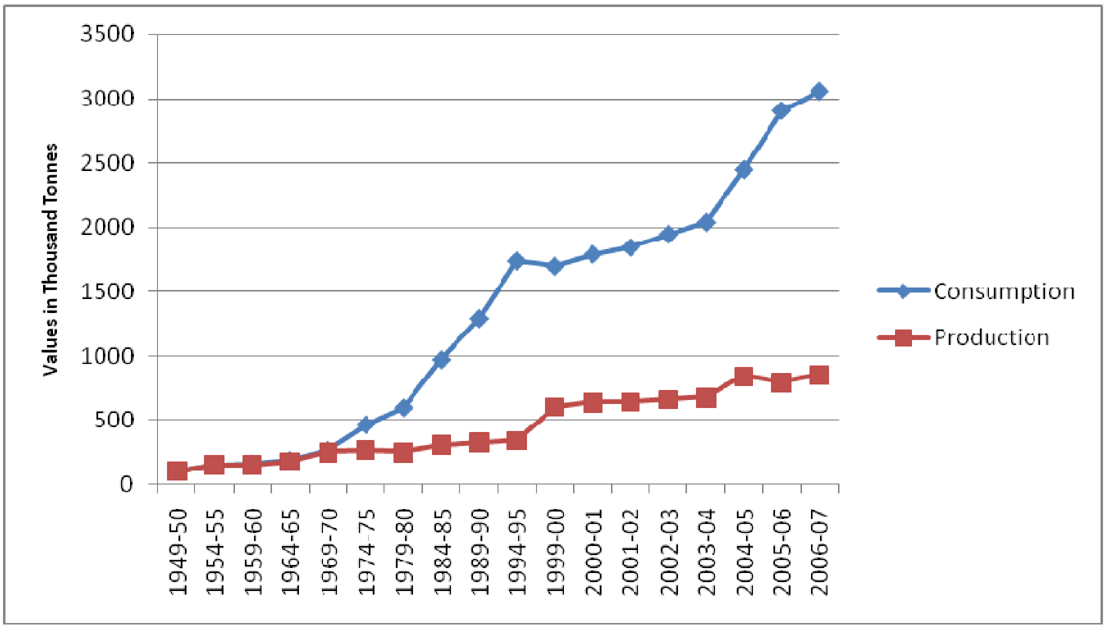
shocks and edible oil price in Pakistan which is ultimately reflected in food expenditure. The common Pakistani food includes a significant quantity of edible oil which is the reason behind high consumption growth rates.

Trends in Edible Oil Deficit

At the time of independence Pakistan was self-reliant in edible oil but later on it began to import edible oil in small quantity to supplement domestic production. Since 1969-70, edible oil consumption began to grow at exorbitant rates and domestic production failed to coupe up with it, as a result edible oil deficit started to grow (Chaudhry *et al,* 1998).

Figure 1 shows that after 1969-70, local supply was unable to match the consumption needs and therefore the two lines started separating from each other. After 1969-70 the gap between the two is increasing at a sharp pace.

Figure 1
Increasing Gap between Demand and Domestic Production of Edible Oils



Source: Author's Estimation based on Chaudhry et al (1998) and Agriculture Statistics of Pakistan (various issues)

The gap between demand and supply has been filled with edible oil imports. Pakistan's edible oil import bill is increased by 1608 times between 1959-60 and 2008-09.[3] Since 1999-00, the import bill grew by 11.1% annually on average till 2008-09 which is significantly less than 21.2% reported by Chaudhry, Mahmood and Chaudhry (1998) for the period of 1959-60 to 1997-98.

One policy to deal with the increasing import bill of edible oil could be the tariff policy. Shivakumar *et al* (2007) found in their study for India that tariff had significant impact on vanaspati and edible oil household consumption however consumption of oilseeds remain unaffected.

Domestic Production of Edible Oil and Oilseeds

Table-1 compares the production of oil seeds and extraction of edible oil from different oilseeds in 2006-07 and 2007-08. Cottonseed accounts for 57.5% and 51.3% of total oil production in FY07 and FY08 respectively. Sunflower accounts for 27.7% and 31.7% in FY07 and FY08 and share of Canola increased from 7.4% to 9.96% in FY08.

Table-1: Area and Domestic Production of Major oil crops in Pakistan for FY 07 and FY 08

Crops	**2006-07**			**2007-08(P)**		
	Area (000 Acres)	**Production Seed (000 Tonnes)**	**Oil (000 Tonnes)**	**Area (000 Acres)**	**Production Seed (000 Tonnes)**	**Oil (000 Tonnes)**
Cottonseed	7599	3890	478	7547	3568	428
Rapeseed/ Mustard	628	204	63	576	172	58
Sunflower	937	656	249	1124	696	264
Canola	359	180	65	402	218	83
Total Oil			**855**			**833**

Source: Economic Survey of Pakistan 2007-08

Safflower and Soya beans are also used for edible oil production but their contribution is so minute that has negligible impact on total oil production. Most of oil crops are low yielding so they were competed out by High Yielding Varieties (HYVs) of wheat, rice, maize and cotton. As a result

[3] Author's estimates based on Agricultural Statistics of Pakistan (various issues)

cultivation area of oilseed crops fell consistently since 1960s (Chaudhry et al, 1998). Oils crops are suffered from different kinds of disincentives. The farmers do not get adequate support price for oilseed moreover farmer's access to the funds is very limited and in some cases the access is completely restricted. There is no price support system for oil crops as a result oil seed farmers faced low and uncertain market prices which acted as a disincentive to private investment. Major losses are incurred after the completion of harvest due to the improper market infrastructure. The private sector has announced to purchase sunflower seeds at Rs1200 per 40 kilogram this year against Rs900 per 40 kilogram last year. This increase in the purchase price of sunflower seeds (33%) apparently seems to give incentive to the farmers to bring more area under sunflower cultivation (Pakistan Chronicle, 2008).

Food Expenditure

Food expenditure accounts for the major share of total household consumption expenditure in Pakistan. Out of total monthly household expenditure, on an average 50 percent[4] share goes to food expenditure. Social welfare is directly linked with the food intake of a person. Healthy food intake would increase the household welfare and consequently economy would be benefited through increase in productivity of human capital.

Davis *et al* (1983) found that household income and household size exerted a significant and positive impact on household monthly food expenditures. They also found that nutrition education played a key role in decreasing food expenditures.

Food expenditure represents a larger share of total expenditure by low-income households all over the world. Food Expenditure of a mid-income urban household is 90% less than that of high income

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[4] Based on Economic Survey of Pakistan (various issues)

household (Gale, 2006). In total food expenditures, food away from home i.e. expenditures at stores and expenditures in restaurants were significantly higher in wealthy households as compared to the households in lower income groups (Kirkpatrick, 2003). Similarly, Horton and Campbell (1990) noted, that low-income households spend their money on food efficiently by buying more economical brands of food items. Average consumption of food declines with the decline in income (Petrovici *et al* 2000). Since July 2007, prices of wheat flour have increased sharply all over Pakistan. In May 2008, prices of wheat flour had more than doubled in provinces with food-deficit compared to a year earlier (Food and Agriculture Organization, 2008).

In countries under lowest per capita income category, edible oil has significant proportion in household food expenditure. The impact of changes in demand, supply and prices of edible oil is much greater in such countries (Drewnowski *et al,* 1997).

Food Subsidies

Inadequate targeting of food subsidies benefits the higher income groups more in absolute terms than the poor because access to the subsidized food items is open to all, as a results, higher income groups increase the consumption of subsidized food (World Bank, 1999). Such inadequate targeting of food subsidies would have insignificant impact on their food expenditure. The policies need for greater attention to the affordability of nutritious foods for low-income groups. If the household has little to spend on food, it will be facing food selection constraint and consequently will purchase nutritionally undesirable food items because he cannot afford to buy better products (Kirkpatrick, 2003).

In case of Egypt, the food subsidies were not designed to serve the poor alone as the subsidized products were available to every consumer. Subsidy policies are intended to increase the living standards of the poor but if the subsidized product would not reach the target consumer, the whole subsidy program would go waste (Gutner, 1999).

Higher food subsidies result in higher food expenditures especially in poor households in Kerala India. In Bangladesh the food subsidy did not have significant impact on food expenditures because most of the subsidy impact was on urban households as it was not feasible for government to reach poor rural households (Farrar, 2000).

This is evident from many countries that well targeted food subsidies increase the purchasing power of the target consumers. The impact is more significant on poor consumers because food constitutes large proportion of their total expenditure. In Pakistan, food subsidies had much more impact on urban poor as compared to rural poor (Andersen, 1988).

Due to cash constraints and cost of availing the subsidy, the poor do not always draw the full quota entitled to them. Study showed that despite of the availability of subsidized food items to all, their purchase decreased by different percentages for all households and purchase of non-subsidized food increase due to the perceived low quality of subsidized food (Khan, 1982).

In Pakistan, people have negative image about subsidized wheat flour due to which in a mild targeting effect have resulted. The government, in return, has to publicize its efforts to maintain high quality in the subsidized foods (Rogers, 1978).

The State Bank of Pakistan (SBP) has proposed revamping of food subsidy program for low-income groups and in order to make it effective, the involvement of private sector has been suggested. According to the SBP, since food prices are likely to remain high in the medium-to-long-term, the structure and implementation plan of the food subsidies for low-income groups should be revamped so that the targeted groups get maximum benefit out of it (Dawn, 2008).

Objective and Scope of the study

Primary objective of the study is to derive the relationship between edible oil deficit and food expenditure in Pakistan. Hypothesis of the study is designed as follows:

H_o = Edible Oil Deficit Positively Affects Food Expenditure in Pakistan

The study is unique in its nature and no such work has been done on this issue. This study will highlight the welfare impact of edible oil deficit, thus it will provide a direction not only to the policy makers but also to the researchers for future research in related issues.

Data and Methodology

Data has been taken in nominal form from various issues of Economic Survey of Pakistan, Pakistan Statistical Year Book, Household Integrated Economic Survey of Pakistan, Pakistan Demographic Survey, Annual Budget Statements and Federal Bureau of Statistics of Pakistan; for the period 1972-2008.

In order to test the hypothesis of this study, different econometric techniques were used. Time series data usually suffer from the unit root problem thus involving a serious violation of assumptions of ordinary least square method of estimation. Keeping this in view, the data was first checked for stationarity before applying conventional Ordinary Least Square method of estimation.

Augmented Dicky-Fuller (ADF) test uses following equation to test whether there is unit root in the time series:

$$\Delta y_t = \beta_1 + \beta_1 t + \alpha\, y_{t-1} + \gamma \sum \Delta y_{t-1} + \varepsilon_t \qquad (1)$$

Where ε_t is white noise error term and t represents time trend. The null hypothesis in ADF test is that variable has unit root.

In addition to ADF, the Phillips -Perron (PP) [1988] unit root test is also used in the study, which is a nonparametric system of controlling for serial correlation while testing for the stationarity of variables. The PP method estimates the following equation:

$$Y_t = \acute{\alpha}_o + \acute{\alpha}_1 y_{t-1} + \acute{\alpha}_2 (t- \frac{n}{2}) + \acute{\varepsilon}_t \qquad (3)$$

Where Y_t is the corresponding time series, n is the number of observations and $\acute{\varepsilon}_t$ is the error term. The null hypothesis of a unit root is H_0: $\acute{\alpha}_1$ =1.

After testing for stationarity our next step would be to investigate the long run and short run relationship between the variables. There are several econometric techniques available to study such relationship. Uni-variate co-integration includes Engle-Granger (1987) and Fully Modified Ordinary Least Squares (FMOLS) of Philips and Hansen (1990); and multivariate co-integration techniques includes Johansen (1988); Johansen & Juselius (1990); and Johansen's (1995). Although these tests are most commonly used to test for con-integration but in recent years, the Autoregressive Distributed Lag (ARDL) model approach, developed by Pesaran and Shin (1996 and 1988), Pesaran *et. al.* (1996) and Pesaran *et. al.* (2001), has become more popular and preferred to other conventional co-integration approaches.

The ARDL technique has become so popular particularly because it can be applied irrespective of the order of integration i.e. purely I(0), purely I(1) or mutually co-integrated (and in small samples) while other cointegration techniques require all variables be of equal degree of integration i.e. either purely I(0) or I(1) (and large samples). All the variables are assumed to be endogenous in the said approach. In this study we employed the Pesaran *et. al.* (2001) approach to investigate the existence of a long-run relationship in the form of unrestricted error correction model for each variable as follows:

$$\Delta lnFEXP_t = \alpha_1 + \beta_1 \sum_{i=1}^{n} \Delta lnFEXP_{t-i} + \beta_2 \sum_{i=0}^{n} \Delta lnEDEF_{t-i} + \beta_3 \sum_{i=0}^{n} \Delta lnPCGDP_{t-i} + \beta_4 \sum_{i=0}^{n} \Delta lnFSUB_{t-i} + \gamma_1 \Delta lnFEXP_{t-1} + \gamma_2 \Delta lnEDEF_{t-1} + \gamma_3 \Delta lnPCGDP_{t-1} + \gamma_4 \Delta lnFSUB_{t-1} + \varepsilon_t \ldots\ldots (4)$$

Where lnFEXP is the per capita food expenditure in natural log, lnEDEF is the edible oil deficit in natural log form, lnFSUB is the food subsidy in natural log, lnPCGDP is the per capita GDP in natural log and ε_t is the white noise error term. The parameters γ_i where i = 1, 2, 3, 4 are the corresponding long-run multipliers, β_i where i=1, 2, 3, 4 are the short dynamic coefficients of the underlying ARDL model. We test the null hypothesis of no cointegration i.e. $H_o : \gamma_i = 0$ or $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$ in equation 4, against the alternative using the F-test with critical values tabulated by Pesaran and Pesaran (1997) and Pesaran *et al* (2001).

If there is evidence of long-run relationship in the model then in order to estimate the long run coefficients, the following long-run model will be estimated:

$$lnFEXP_t = \alpha_1 + \beta_1 \sum_{i=0}^{n} lnFEXP_{t-i} + \beta_2 \sum_{i=0}^{n} lnEDEF_{t-i} + \beta_3 \sum_{i=0}^{n} lnPCGDP_{t-i} + \beta_4 \sum_{i=0}^{n} lnFSUB_{t-i} + \mu_t \ldots\ldots (5)$$

If we find the evidences of long run relation then in the 3rd step we utilize the following equation to estimate the short run coefficients:

$$\Delta lnFEXP_t = \alpha_1 + \beta_1 \sum_{i=1}^{n} \Delta lnFEXP_{t-i} + \beta_2 \sum_{i=0}^{n} \Delta lnEDEF_{t-i} + \beta_3 \sum_{i=0}^{n} \Delta lnPCGDP_{t-i} + \beta_4 \sum_{i=0}^{n} \Delta lnFSUB_{t-i} + \varphi_1 ECM_{t-1} + \delta_t \ldots\ldots (6)$$

Where φ_1 is the error correction term in the model which indicates the pace of adjustment towards long run equilibrium following a short run shock. ECM $_{t-1}$ represents the error correction term derived from long-run con-integration equation through a newly developed technique of ARDL, β_i(i=1, 2, 3, 4) are constant terms, and δ_i is the serially uncorrelated random disturbance term with mean zero. Long-Run relationship can also be verified through the model specified in equation (6), with the significance of the lagged ECM by t-test.

The ARDL approach involves two steps for estimating the long run relationship (Pesaran *et. al.*, 2001), first step is to investigate the long run relationship among the variables specified in the equation, and the second step is to estimate short run causality. The second step is only applied when existence of long run relationship is found in the first step (Narayan *et. al*. 2005). Two sets of asymptotic critical values are provided by Pesaran and Pesaran (1997) and Pesaran *et. al.* (2001). The first set assumes that all variables are I(0) while the second based on the assumption of I(1). The null hypothesis of the no cointegration will be rejected if the calculated F-statistic is greater than the upper bound critical value, implying that there exists long run relationship among the variables. If the computed statistics are less than the lower bound critical values, we cannot reject the null hypothesis. Lastly, if the computed F-statistics falls within the two bound critical values discussed above, the result will be inconclusive.

In addition to the ARDL approach for the investigation of a long run relationship between the variables in multivariate models, the Johansen cointegration technique will also be used in this study[5]. Johansen (1988) and Johansen and Juselius (1990) presented the method to estimate the maximum likelihood estimators in multivariate models (Yuan M. *et al*, 1994). They also present

5 Brooks C. (2002)

two likelihood ratio tests, one based on maximal eigenvalue with Ho that the number of co-integrating vectors is less than or equal to r against the H1 of r+1 co-integrating vectors and other test based on trace test with the same null hypothesis and H1 that there are at least r+1 co-integrating vectors. In order to apply Johansen cointegration technique, it is necessary that the variables should be stationary at I(1) (Ahlgren N. et al, 2002).

Empirical Results

In order to check for non-stationarity problem in the variables, Unit root test were applied at level and 1st difference. Results of the unit root test are shown in Table-1. Using ADF test we found mixed results in level form but all variables were found to be stationary at 1st difference.

Table-2: Unit Root Test Results

Variables	ADF TEST		Phillips-Perron	
	Level	1^{st} Difference	Level	1^{st} Difference
lnFEXP	-4.79*	-3.92**	-2.95	-3.99**
lnFSUB	-2.05	-5.63*	-2.21	-5.63*
lnPCGDP	-3.66**	-5.59*	-4.27*	-14.8*
lnEDEF	-3.32***	-9.95*	-5.37*	-10.83*

* shows significance at 1% level, ** at 5% level, *** at 10% level

Our next step would be to identify the optimum lag order for co-integration. Table-3 compares the results of four different criterions for optimum lag selection. Both SC and LR statistic suggest that we should not go for more than one lag because of small sample size.

Table-3: Optimal Lag Selection

Lag	AIC	SC	HQ
0	**-7.510061***	**-7.323235***	**-7.450294***
1	-6.876326	-5.942194	-6.577489
2	-6.465071	-4.783635	-5.927165
3	-5.841493	-3.412751	-5.064517

* indicates lag order selected by the criterion
SC: Schwarz Criterion, HQ: Hannan-Quinn Information Criterion

We can see from Table-3 that according to all the three criteria of optimal lag selection, lag 0 is the optimal lag for error correction representation of ARDL model. However, since the model is Autoregressive (i=1 for endogenous variable), we must use first lag of the dependent variable in the equation.

Analyzing the results of unit root tests and optimum lag selection criteria, our next step would be to apply ARDL approach to check for the long run relationship amongst the variables. Results of the test are given in Table-4.

Table-4: Bound Testing for Co-integration

Dependent Variable(s)			Wald Test	
	ΔFEXP		*F(4, 25) = 6.82* *P=0.0007*	
Critical Value	Pesaran ***et al*** (2001)[1]		Narayan P (2005)[2]	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1%	5.37	6.36	6.38	7.73
5%	4.01	5.07	4.568	5.795
10%	3.47	4.45	3.80	4.888

* (**) Significant at 5% (10%), according to Pesaran et. al., 2001
[1] Table CI (V): Unrestricted Intercept & Unrestricted Trend, (Pesaran *et. al.* 2001, 301)
[2] Table CI (V): Unrestricted Intercept & Unrestricted Trend, (Narayan, 2005, 1990)

Results presented in Table-4 shows that according to critical values developed by Pesaran et al (2001), there is a long run relationship amongst the variables as Wald test F-statistic is greater than the upper bound of 1% critical value proving that there is long run relationship amongst the variables. According to critical values of Narayan P (2005), wald test F-statistic is greater than the upper bound of 5% critical value, verifying the result from Pesaran stats i.e. long run relationship exists amongst the variables. We can also verify from error correction model of ARDL for long run relationship using the coefficient of ECM(-1). If the coefficient has negative sign and it is statistically significant then we can say that long-run relationship exists between variables.

Table-5: Estimated Long Run Coefficients using the ARDL Approach[6]

Dependent Variable LNFEXP		
Regressor	*Coefficient*	*Prob- value*
LNEDEF	-0.148	0.087
LNFSUB	0.537	0.482
LNPCGDP	0.261	0.004
R-Squared = 0.995		
F-stat = 1316.3 [0.000]		

Long-run coefficients presented in Table-5 suggest that Edible oil deficiency had significant and negative relationship with Food Expenditure because of the inefficiency in domestic edible oil production. The coefficient suggests that with 1% increase in edible oil deficit, food expenditure would decrease by 0.14 percent. Countries from which the edible oil and oilseeds have been imported are much more efficient than Pakistan's domestic industry for edible oil and hence, due to low cost of production, they sell us at a price lower than local market price but relying on imports would multiply the import bill in the long run which would exert pressure on balance of payments. Hence in the longrun, both consumer and producer will suffer. Per-Capita GDP has significant and positive long run relationship with Food Expenditure suggesting that higher income per member of a household will lead to higher food expenditure; especially in poor households due to the shift in quality of food consumed (Kirkpatrick, 2003). Interestingly, coefficient for Food Subsidy (in natural log) was found to be statistically insignificant. This would mean that the targeted beneficiaries of the subsidy were unaffected by it. As discussed earlier, the reason for its insignificance is that food subsidies are often not well targeted and hence the group of consumers meant to get benefit, does not actually get it (Rogers, 1978). Moreover, even if the subsidy is well targeted, there is a common perception about the bad quality of subsidised food items. Thus, many

[6] ARDL(1, 1, 0, 0) selected based on Akaike Information Criterion

of the consumers are hesitant about subsidised food and hence the food expenditure is not affected by food subsidy programs [Khan, (1982) and Kavand, (2007)].

Table-6: Error correction Model[7]

Dependent Variable ΔLNFEXP		
Regressor	Coefficient	Prob- value
ΔLNEDEF	0.053	0.487
ΔLNFSUB	0.098	0.197
ΔLNPCGDP	0.190	0.418
ECM(-1)	-0.405	0.005
R-Squared[8] = 0.5		
F-stat = 4.513 [0.003]		

Table-6 compares the significance of exogenous variables and it is evident that all three variables were insignificant suggesting that per capita GDP, Food Subsidy and Edible Oil deficiency does not significantly affect the food expenditure in short run. The relationship between LNPCGDP and LNFEXP was found to be insignificant because of food expenditures have very low income elasticity and they remain unaffected in the short run if income changes. The insignificance of LNEDEF and LNFSUB would suggest that food expenditure remain unaffected in the short run in response to the variance in edible oil deficiency and food subsidy. The estimated lagged error correction term ECMt-1 is negative and highly significant reinsuring the longrun relationship between the variables. The feedback co efficient is -0.405 suggesting that about 0.41% disequilibrium is corrected in the year of short run shock.

7 ARDL(1, 1, 0, 0) selected based on Akaike Information Criterion

8 R-Squared measure refer to the dependent variable ΔLNFEXP and in cases where the error correction model is highly restricted, these measures could become negative.

Co integration results

Table-7:		Tests based on Maximal Eigen-value of the stochastic matrix		
H_o	**H_1**	**Max Eigen Statistic**	**95% Critical Value**	**p-value**
r=0	r=1	32.54*	32.11	0.0443
r≤1	r=2	19.11	25.82	0.2976
r≤2	r=3	10.85	19.38	0.5279
r≤3	r=4	6.72	12.51	0.3743

Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

The results of Johansen Co-Integration test based on Max Eigenvalue reported in Table 7 suggest that there was one co-integrating equation in the model and there was an evidence of long run relationship amongst the variables supporting the ARDL results. Similarly Table-8 presents the results of Johansen test based on Trace Statistics and using this criterion we came to the same conclusion that there is one co-integrating equation, proving that there is a long run relationship amongst the variables.

Table-8:		Tests based on Maximal Trace of the stochastic matrix		
H_o	**H_1**	**Trace Statistic**	**95% Critical Value**	**p-value**
r=0	r≥1	69.24*	63.87	0.0165
r≤1	r≥2	36.69	42.91	0.1820
r≤2	r≥3	17.58	25.87	0.3727
r≤3	r≥4	6.72	12.51	0.3743

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

Conclusion and Policy Recommendations

We found that edible oil deficit has negative and significant long run relationship with Food expenditure of a household. The coefficient suggests that with 1% increase in edible oil deficit, food expenditure would decrease by 0.14 percent. The relationship between the per capita GDP and food expenditure is found to be positive and significant with elasticity of 0.261 suggesting that 1 percent increase in per capita GDP will cause food expenditure to increase by 0.26 percent. The relationship between food subsidy and food expenditure is found to be insignificant suggesting that Government's food support programs are not effective, on account of improper targeting; and consumers' perception about quality and accessibility of subsidized food.

Negative relationship between edible oil deficit and food expenditure suggests that edible oil has been produced much more efficiently in the edible oil exporting countries due to which it has been imported at low prices. It seems beneficial for consumers but from long run macroeconomic perspective, imports growing at alarming rate would exert pressure on balance of payment deficit and economy would suffer.

Pakistan needs to exploit its unrealized yield potential in production of oilseed crops. In order to accomplish this effectively the cultivation of individual oil crops should be attached priority on the basis of their oil yields, climatic requirements and consistency with other national objectives. Crops that are used internationally in production of edible oil, are yet to be used in Pakistan, and needs urgent attention in order to deal with the increasing deficit of edible oil. Instead of relying on production of other countries, Pakistan needs to focus on strengthening the domestic production of edible oil and oilseeds.

There is also a need to encourage the cultivation of non-traditional oil seeds i.e. sunflower, safflower, canola & soyabean. Olive along with other oilseeds crops has bright prospects for becoming the major edible oil source for the country if handled properly (Kakakhel 2008).

The area which are found socially profitable for the cultivation of oil seeds crops should be declared as an "Oil seed Zones". For this purpose there is a need to have an environment and soil research to find out the feasibility of the olive oil cultivation. The Potowar area, has great potential to bring the import burden of the country to meets it edible oils demand. The potential is also found in the Balochistan areas which include Khuzdar, Loralai, Quetta, Pishin, Zhob and Sibi etc (Chaudhry 2008). The weather conditions (high rain falls) in the northern part of the Punjab, and the Hazara area in NWFP are quite suitable for the olive oil cultivations. The policy makers should explore and design a strategic framework for the olive oil cultivations to achieve the economic growth either via government interventions or bringing private investments (Amir 2006).

The efforts of research and teaching are needed to be closely coordinated in order to improve the efficiency in oilseed sector. Comprehensive training programs are required for the education of farmers to understand the new techniques of farming. Farmers should be encouraged to use their land for oilseed cultivation by ensuring the return on it. Pakistan should also improve oil extraction efficiency by reducing wastages, modernization of oil extraction industry and revival of solvent extraction industry through incentives. There is a need to allocate sufficient credit for the purpose of working capital during the harvesting season to these industries.

Another way to increase cultivation of oil seed crops is to attract small farmers with 5 to 12.5 acres of land holding toward cultivation of oilseeds through provision of inputs like seed, fertilizers, irrigation and credit because these farmers have low financial capacity. Awareness is needed to be developed in the small farmers in order to encourage them to shift to oilseed crops. Agriculture Policy making should properly involve small farmers and peasants to ensure maximum efficiency and productivity through accurately targeted policies.

Improved management practices are needed to raise production. Per acre yield can be increased by introducing higher yielding hybrids, early maturing hybrids, hybrids resistant to insects, pests and diseases, availability of other inputs such as fertilizers, irrigation etc. and adoption of modern technology.

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