

1 Determination of Domestic Prices of Milk and Wheat in 2 Pakistan: Error in Estimation

3 riaz ahmed

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5

6 **Abstract**

7 The domestic prices of traded goods in an open economy are a function of international prices
8 and the levied tariff rates. The key question arising here is whether the domestic prices can be
9 ?estimated? from the information on international prices and the tariff rates given that the
10 later two independent variables are determined out of the system? Some authors have
11 ?estimated? domestic prices from international prices and the tariff rates. However the
12 estimation of domestic prices in such way has presented inaccurate estimates. Present study is
13 an attempt to correct such failing in case of domestic prices of milk and wheat and strived to
14 calculate instead of estimating the domestic prices in presence of two independently
15 determined variables i.e. tariff rates and international prices.

16

17 **Index terms**— Domestic prices, Error in estimation, Credit goods.

18 **1 Introduction**

19 he domestic prices are determined from the information on international prices and the tariff rates. Since the
20 price variations accounted for here are trade and tariff driven, it would be interesting to know how domestic prices
21 of traded goods are determined in the local market when the tariff rates change. Pakistan, being an economically
22 small developing country, plays the role of a price taker in the global trade sector. Thus in analogy with other
23 small open economies, the determination of domestic prices of traded goods in Pakistan would look as follows:
24 $w_i P = P (1+t) (1)$

25 rate of tariff (which is also exogenously determined as it is fixed by the government). This is shown in the
26 following set of equations.

27 $) t ($

28 It can be inferred from equation (3) that given exogenous world price, the absolute change in the domestic
29 price depends upon the international price times the tariff change. Taking log on both sides to linearize equation
30 (3) we have; $t (1 \ln P \ln P_i w_i + = (4))$

31 For simplicity reasons, here we would allow the relaxation of two strong assumptions. Firstly, there are unified
32 products and one tariff line for imports of the same product for all countries. In this way, we are indeed relaxing
33 the Armington assumption [Lloyd, J. P. et al. (2006)] of differentiated products with respect to their various
34 points of origin or production (countries). Secondly, it is further assumed that the goods have similar prices
35 throughout the whole country. See Table 1 for the summary of the percentage difference between the domestic
36 prices of two goods in major cities of Pakistan 1 .

37 Here P_i and P w_i are the domestic and world prices of the traded goods i respectively, and t_i is the rate of tariff
38 applied on traded goods. If the international price is exogenously determined, then the change in the local price
39 would be established by the given change in the Though, in developing countries, this assumption may not hold in
40 its entirety for a variety of reasons such as irregular market structures, information unevenness, etc. Nevertheless,
41 in the case of Pakistan, owing to sea access and a relative good communication and transportation infrastructure,
42 as well as developed markets in urban sectors, equation (??) can be a reliable exercise to determine the absolute
43 price changes caused by a change in tariff.

44 2 II.

45 3 Data

46 The main sources of data are FBS' (Federal Bureau of Statistics) book '50 years of Pakistan in Statistics' all
47 volumes and FBS online statistics portal 2 ; online datasets of Federal Board of Revenue (FBR), Pakistan, a
48 public sector organization formerly known as Central Board of Revenue responsible for collecting all types of
49 tax revenues and framing national tariff policies 3 ; Food and Agriculture Organization (FAO) online datasets.
50 Due to the unavailability of straight forward data on tariff rates on the two goods, the appropriate data has
51 been calculated from available statistics before using in the study. The detailed description on the calculation
52 and quality of data used in the study is provided in the following paragraphs. Following paragraphs present the
53 issues related to the quality and availability of the data used on the domestic and international prices of the two
54 selected goods.

55 The data on the import tariff per ton on the two goods is not available in a straight forward fashion instead
56 the information on total tariff revenue collected from various commodity groups is available from the Federal
57 Board of Revenue (FBR) for the years from 1992 to 2005. Amongst, the provided selected commodity groups
58 are fruits, nuts and vegetables; tea, coffee and spices; milk, butter and cheese; animal and vegetable oil; edible
59 cereals and vegetables; tobacco; fuels and oils; sugar and confectionary; and meat, fish and other preparations.
60 The two goods, wheat and milk, selected for the present study fall in "milk, butter and cheese" and "edible
61 cereals and vegetables" groups. The tariff per ton on each commodity group is calculated by dividing the total
62 yearly tariff revenue in PKR for 1992-2005 by the total import (C.I.F) quantity in tons of all varieties of goods
63 in the respective commodity group. For example, the tariff per ton in PKR on the commodity group of milk,
64 butter and cheese is calculated by dividing the total tariff revenue in PKR collected from the commodity group
65 by the total sum of the import quantities in tons of milk, butter and cheese. See Table 2 for summary of the
66 information. Since milk and wheat are the most dominant traded goods in the above two groups therefore the
67 calculated average commodity-wise tariffs may also apply to the individual goods.

68 Table 3 presents the real world tariff for some years acquired from the WTO online data sets on the two
69 commodities 4 . International prices are taken from the FAO online dataset and are presented in the following
70 table 4. Source : Food and Agriculture Organization (FAO) online data set 5 The domestic prices of selected
71 goods are taken from FBS' 50 years of Pakistan in Statistics (from 1992 to 2005) 6 and are the averages of the
72 prices in major cities of Pakistan. The average variation in the domestic prices of goods across major cities of
73 Pakistan is trivial so these prices can best reflect the domestic prices in Pakistan in general. See following Table
74 1 above.

75 The domestic prices from 1997-2005 are taken from the statistical year book 2006 published by FBS. All prices
76 have been taken in local currency (PKR) per ton. The calculated tariff per ton is then added to the international
77 prices to determine the domestic prices.

78 4 III.

79 5 Failing

80 The approach is based on the specifications of Porto (2003, 2006) to correct some of its methodological
81 inaccuracies. Porto (2003) implicitly treated the import tariff rates as determined in the system which is against
82 the fact that the trade policy of any country introduces the tariff rates on import of various commodities from
83 prices on the international prices and the tariff rates. Resultantly, it produced estimated domestic prices which
84 may not be accurate so cannot be relied for further policy making.

85 In present study this failing has been proved and suggested that the domestic prices can be computed instead
86 of being estimated by exercising the simple addition of information on import tariff per ton to the international
87 prices of the two goods. Following paragraphs show how the failings may be corrected and the calculated domestic
88 prices reflect better approximation of domestic prices rather than the estimated domestic prices.

89 As an initial step, the domestic prices of wheat and milk are estimated using OLS Least Squares Method.
90 Following section provides a detailed discussion on the regression methodology, functional form and the results.

91 IV.

92 6 Regression

93 The domestic prices of wheat and milk are estimated using real tariff rates available from WTO online dataset.
94 The functional form of the regression equation is the natural log to linearize the price equation 3 to the form
95 of equation 4. The regression results are significant and reliable as indicated from the large t-and f-values and
96 their significance near to zero chance of error. Fairly large R2 indicates the overall satisfactory coverage of the
97 regression analysis. (Table 2).

98 .37

99 Slightly large value of the constant indicates that there are some factors which affect the domestic prices of
100 milk and wheat other than the tariff rates. However other values and the positive signs of the coefficients are in
101 congruence with the expected and hypothesis.

102 The calculated domestic prices on average tariff rate are compared with the estimated domestic prices at
103 average tariff rate and the calculated domestic prices at the real world tariff rate. 7 The calculated prices at
104 average tariff rate are found closer to the calculated domestic prices at real world tariff rate than the estimated
105 domestic prices.

106 This indicates the methodological error in Porto (2003) 8 who took the estimated domestic prices instead of
107 calculated prices. The Figure 1 (wheat and milk estimated and calculated domestic prices) confirms that the
108 average tariff rates calculated on various commodity groups are also applicable to the individual commodities
109 selected in the study. Porto (2003) estimated the domestic

110 **7 Wheat (PKR per ton) Milk (PKR per ton)**

111 Estimated domestic prices at calculated Tariff Calculated domestic prices at calculated Tariff Calculated domestic
112 prices at real world tariff The prices taken as an indicator of the domestic prices of milk and wheat are not the
113 estimated ones instead they are the calculated ones obtained by adding the tariff per ton to the international
114 prices.

115 V.

116 **8 Conclusion**

117 Estimating the domestic prices of traded goods in presence of international prices and tariff rates may not be
118 a good approximation since the two independent variables are exogenous and determined out of the system.
119 Therefore the failings in the past studies may be corrected by simply adding the international prices to tariff
120 rates to determine the domestic prices of the goods. It has been attempted here to correct this flaw by using
information on the prices and tariff rates of milk and wheat for Pakistan. 1 2 3 4 5



Figure 1: Table 4 :

121

¹Major cities are: Karachi (Port city), Lahore, Sialkot, Rawalpindi, Peshawar, Quetta, Islamabad.

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⁴<http://tariffdata.wto.org/ReportersAndProducts.aspx>5 Real world tariff rates (in percentage) are available from WTO online dataset for 1999-2002 and 2004-2005 on some goods. These tariff rates on various goods are used as a benchmark to verify the reliability and accuracy of the average calculated tariff.6 Volume IV. Pp. 477-503.

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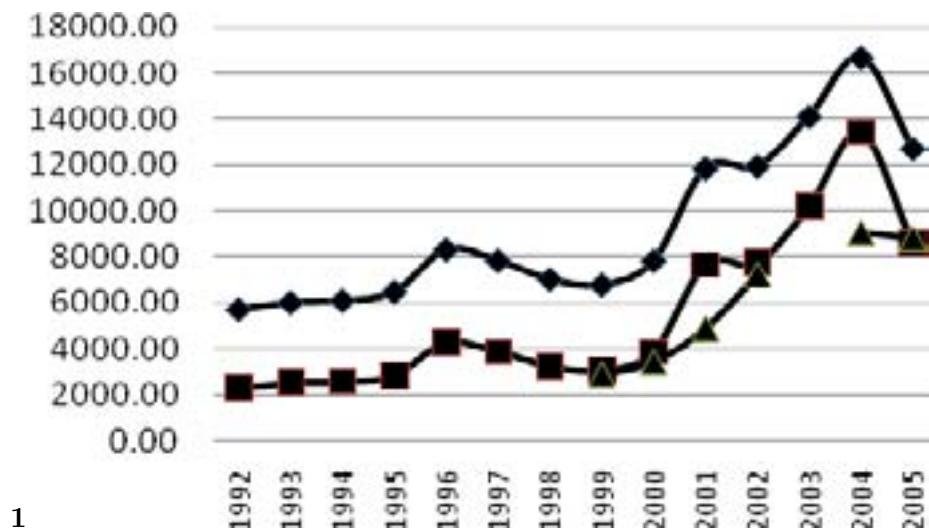


Figure 2: Fig. 1 :

1

	1992	1994	1996	1998	2000	2004		
Wheat flour	-0.244211	-0.7886	-0.5986	-1.9057	-0.2967	-0.2348538		
Milk	-1.727605	-1.711			-1.2273	-1.1534	-1.2862	-0.7658772

Figure 3: Table 1 :

3

Figure 4: Table 3 :

Import (Tons)	Total Revenue (PKR)*	Tariff per ton in PKR**	Import (Tons)	Total Revenue (PKR)

Figure 5: Milk, Butter and Cheese Edible prep. Cereals and vegetables

5

Years	Wheat	Milk
1992	7951	3649
1993	9008	4036
1994	10256	4674
1995	11280	4720
1996	12428	6004
1997	13595	7408
1998	14953	7231
1999	15620	7694
2000	15906	8244
2001	16057	7871
2002	16525	8825
2003	16525	9150
2004	16800	10696
2005	17000	11126

Figure 6: Table 5 :

2

	Coefficients	Standard Error	T	F	R ²
Wheat	3.942	Constant International price and Tariff .608	Constant International price and Tariff .678	5.812 (0.000)	7.579 (0.000)
Milk	6.096			.136	57.445 (0.000)

Figure 7: Table 2 :

5

Figure 8: Table 5

6

Estimated Prices	Wheat		Milk		
	Calculated Prices at Tariff	Calculated Prices at average tariff	Estimated Prices	Calculated Prices at average tariff	Calculated Prices at actual tariff
1992	2303.19	5710.44		18198.05	15372.38
1993	2512.14	6020.14		11549.63	13043.77
1994	2564.06	6095.50		29086.18	18210.46
1995	2835.30	6479.90		14966.69	14324.13
1996	4274.04	8317.06		13760.75	13895.92
1997	3874.86	7835.60		16228.91	14749.33
1998	3237.58	7024.46		17524.88	15164.46
1999	2893.62	3054.84	6780.59	21909.05	18106.10
2000	3417.45	3874.23	7834.82	47965.89	38503.78
2001	4885.09	7657.62	11857.50	25368.37	22506.73
2002	7216.55	7751.85	11946.03	28339.09	27072.45
2003	10189.22		14107.03		44670.53
2004	9040.87	13416.13	16676.47	31543.21	29771.98
2005	8798.66	8592.59	12718.04	36635.98	34835.70

Figure 9: Table 6 :

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