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TARIFF PROTECTION POLICIES OF MAJOR AGRICULTURAL CROPS IN IRAN

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ABSTRACT

Iran`s Agricultural sector is characterized by high tariffs which appear consistent with its political economy equilibrium. To assess tariff structure of agricultural sector, we need to understand what determines that structure. In this article, tariff equation of agricultural sector has been estimated for 100 selected agricultural crops using OLS method. Political variables, as independent variables in tariff equation, include concentration index, Import/output ratio, Intra-industry trade, degree of processing and wage. The overall fit of the equation is acceptable and variables tend to have the expected signs, at high significance level. Afterwards, political optimum tariff and political protection indicator are estimated for all intended products. This political-economy analysis allows us to identify two sets of protected products. First, over-protected products (most of fully- processed products) are those which their actual tariffs are higher than their political optimum tariffs (the value predicted by the political economy variables described). Tariff reduction should not be politically costly. Then, tariff cuts could be more speedy. Second, under-protected products (most of first stage products) are those which their actual tariffs are lower than their political optimum tariffs. Tariff reduction will be politically costly and longer adjusted period may be necessary. In both cases tariff reductions would improve resources allocation and efficiency within the agricultural sector. Therefore, Iranian authorities should consider speeding up long term tariff cuts to provide effective levels of protection.

Key words: Agricultural Sector, Tariff Protection, Over and Under-protected Products, Political Protection Indicator.

INTRODUCTION

Trade protection policy is a controversial issue since it`s effects usually have ambiguous and mostly unexpected results on social welfare. In many empirical evidences , final impact of agricultural trade protection (for example tariff rise which leads to increase in domestic price of agricultural crops) on farmers in developing countries has been completely reversed in the existence of monopolistic powers which dominate farmers who are solely price takers in a relatively perfect competition market. Perhaps no other area of economics displays such a gap between what policy makers practice and what economists preach as does international trade. The superiority of free trade is one of the profession`s most cherished beliefs, yet international trade is rarely free. While economists openly suggest trade liberalization as the best long-run trade policy for maximization of social welfare, politicians usually tend to barricade trade using tariff or non-tariff barriers mostly to increase government`s tax revenues. Iranian trade history has not been exempted from this reality. It has been influenced by import substitution industrialization approach and consequently agricultural sector has been ignored in favor of industry .It has led to dramatic interference of government in the economic activities, specifically in the field of trade policies where Iranian tariff regime is characterized by high average tariff (nominal and import-weighted tariff) , an extremely high dispersion of tariff levels across tariff lines and a significant amount of tariff escalation.

Tariff reduction as the only instrument to amend Iranian trade regime requires costly and chronic process. We need to know what determines Iranian tariff structure in order to assess the political cost that tariff reduction may induce. In this article the theoretical and empirical pattern of endogenous tariff formation is followed. The theory of endogenous protection describes how a combination of agent`s preferences over trade policy and the weight given to different group's preferences may translate into deviations from first-best trade policies. This political-economy analysis allows us to identify two sets of protected products. First, over-protected products are those which their actual tariffs are higher than their political optimum tariffs. Tariff reduction should not be politically costly and could be more speedy. In this case tariff reduction would improve resources allocation and income distribution within the agricultural sector. Second, under-protected products are those which their actual tariffs are lower than their political optimum tariffs. Most of agricultural crops are included in this group. Tariff reduction in this case is politically costly and longer adjusted period may be necessary. Regardless of its costs, political tariff reduction remains as the best method to make domestic agricultural economy more competetive whether it could happen in a short period of time or longer period is needed.

MATERIALS AND METHODS

The main results of the theoretical and empirical literature are briefly summarized in this section[1]. This framework will be used to identify products which their tariffs are above their political optimum and also those whose tariffs are under their political optimum.[2]

The theory of endogenous tariff protection is presented below using G-H model[3]. The Grossman-Helpman (GH) model has been widely accepted in the literature on the political economy of trade policy, as Swinnen (2009) explains**: "Surveys of the political economy of trade literature indicate useful characteristics of the GH model. According to Gawande and Krishna (2003), another major advantage of the GH model is for empirical applications: it allows one to go beyond structural econometric models and to relate empirical specifications more closely with theoretical models."** Although this model has many advantages, there are problems with empirical analyses using the GH model: "**To estimate the GH model empirically requires data on lobbying. This makes estimating the model interesting for the US where data on lobbying through political action committees (PAC) are available (Bombardini 2005). However, this is typically not the case in other countries, which makes such estimations more problematic. There are a few studies which have tried to estimate the GH model for other countries. They include Gawande, Singuinetti, and Bohara (2005) on Mercosur, Mitra, Thomakos, and Ulubasoglu (2006) on Turkey, and Belloc and Guerrieri (2008) on the EU. However, where data on actual lobbying are not available, lobby activities are proxied by other indicators in these studies. Typically these proxies are quite *ad hoc*.**"

Ceteris paribus, the level of protection received by a sector is higher *:*[4]

- *The higher the level of industry concentration*[5]. This captures free-riding incentives. On one hand, industry concentration allows to solve the free-riding problem. On the other hand, an increase in group size may result in higher group contributions. However, there is a general presumption that industry concentration leads to higher levels of protection and this is confirmed in the empirical section.
- *The lower the import penetration ratio*[6]. The rationale for this is that the lower the import penetration ratio, the lower the relative weight of consumers compared to producers in the government's objective function. To see this, note that *m/y = (c-y)/y=c/y-1* where *m* are imports (or net imports) , *c* is consumption and *y* the level of production.
- *The higher the degree of processing*[7]. Here we capture lobbying rivalry. if sector *j* purchases goods from sector *i* then sector *j* will counter – lobby any increase in sector *i*'s level of protection . Thus, the higher the share of sector *i* production that is purchased by other sectors the smaller the endogenous tariff. Therefore, as long as consumers are not organized, consumer goods receive, ceteris paribus, higher levels of protection than intermediate goods.

- *The smaller the share of intra-industry trade*.[8] Cadot et al.(1997) argue that the larger the share of intra –

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[1]For review of the empirical and theoretical literature, see Rodrik (1995) .For recent study refer to Lagadec,G,2014

[2] See Madani ,D. and olarreaga,M. (2002)

[3]Grossman and Helpman (1994) showed that the political equilibrium tariff is equal to:

$$\frac{t_i}{1+t_i} = \frac{\hbar_{iL} - \sim_L}{\sim + \sim_L} \cdot \frac{x_i}{m_i £_i}$$

where $\hbar$ is an exogenous indicator which equals one if a product is represented by a lobby, $\sim_L$ is the exogenous share of the population that is represented by lobbies, x_i is the domestic output of product i, and $£_i$ is the import demand or export supply elasticity

[4]All these results are also well documented in the empirical literature on endogenous tariff formation, see Rodrik (1995) . However, both the theoretical and empirical results are somewhat partial equilibrium, since they do not necessarily account for the simultaneity bias . for an empirical study that accounts for the simultaneity bias between imports and tariffs, see Trefler(1993). This aspect is neglected in the empirical section .

[5] See Rodrik (1987) for a theoretical justification and Trefler(1993) for empirical examples. See also Trefler, D,(2009) as an earlier study

[6] .See Grossmam and Helpman (1994) for a theoretical justification and also Grossmam and Helpman (2005) . this result has bees generally challenged on empirical grounds, as discussed by Rodrik (1995).For older empirical example see Anderson (1987). For recent evidence see Leah C. Stokes (2013).

[7] .See Cadot et al. (1997) for a theoretical and Marvel and Ray (1983) for empirical examples. For an earlier evidence see Cadot ,O , Suwa- Eisenmann,A, Gallezot,J (2009)

[8] For theoretical explanations see Cadot et al. (1997), levy (1997) and Marvel and Ray (1983) ; For earlier studies refer to Greenaway, D, Chris R. Milner, (2006)Lee,Hyon-Hoon and Peter J. Lloyd(2002)

industry trade in total trade, the larger the elasticity of import demand for goods produced in the domestic economy , and thus following Ramsey pricing rule, the lower the tariff (since the efficiency costs of a tariff is relatively large compared to the producers gain in that case). Marvel and Ray (1983) suggest an alternative explanation based on intermediate inputs counter-lobbying: they argue that intra – industry trade essentially arises among producers (purchase of intermediate goods), and as producers are more concentrated than consumers, they tend to be more efficient in combating protectionist pressures. Finally, Levy (1997) argues that an increase in intra–industry trade benefits all agents whereas an increase in inter–industry trade has the usual stolper–Samuelson redistributive effects and therefore are subject to more conflict and higher lobbying pressures.

If one assumes that labor markets are segmented in the sense that labor is better conceived as being mobile across a particular group of industries rather than across the economy as a whole, then it can be shown that the level of protection received by an industry or product is higher:

- *The lower the equilibrium wage*.[1] Cadot et al.(1997) show that the optimal endogenous tariff of each sector is positively related to the share of specific capital in total sales. Then, the wage in sector *I* (once we control for output and labor/capital ratios), the smaller the share of capital in total sales, and therefore the smaller the incentives to lobby in the political game.

Empirical specification

The tariff equation of agricultural sector is given by [2]:

$$\text{Log } T_i = \alpha_0 + \Sigma\ \alpha_k \log\ pv_{i,k} + \mu_i \qquad (1$$

Which subscript *i* refers to 100 most important agricultural products aggregation of the HS 8-digit classification. T_i is actual tariff in product *i*, αs are parameters, $PV_{i,k}$ is the political economy variable *k* in product i , μ is the error term . The political – economy variables were listed above. The construction of these variables are given in the annex.

Identification of over-protected and under – protected products: The political-economy analysis also allows us to identify over-protected and under – protected products. The Political Protection Indicator (I_i) is determined by the ratio of actual tariff level (t_i) to fitted value ($\hat{t}_i$) estimated from the equation 1: (Madani ,D. and olarreaga,M.,2002)

$$I_i = \frac{t_i}{\hat{t}_i} \qquad (2$$

The fitted values ($\hat{t}_i$) , estimated from equation 1, represent optimal tariffs in the presence of above-mentioned political variables ($PV_{i,k}$). Equation 1 can be easily estimated using Ordinary Least Squares (OLS). OLS is a method for estimating the unknown parameters in a linear regression model, with the goal of minimizing the differences between the observed responses in some arbitrary dataset and the responses predicted by the linear approximation of the data .The OLS estimator is consistent when the regressors are exogenous and there is no perfect multicollinearity, and optimal in the class of linear unbiased estimators when the errors are homoscedastic and serially uncorrelated. Under these conditions, the method of OLS provides minimum-variance mean-unbiased estimation when the errors have finite variances. That`s why OLS method has been used for estimation of Equation 1 to access fitted tariffs. These fitted tariffs are compared with actual tariffs and then Political Protection Indicators (I_i) will be calculated.

If the ratio I_i is larger than 1 then this indicates that the product has a higher tariff level than what would have been predicted from the above estimation.

We identify over-protected products as those whose actual tariffs are higher than the value predicted by the political economy variables described. This corresponds to all products for which the indicator in the last column of table 2 is above 1. Vice versa, if this indicator is below 1, that product is under-protected.

RESULTS AND DISCUSSION

Table 1 shows the estimation results of tariff equation of Iran's agricultural sector for 100 selected crops whose data was available. The estimation method is OLS. All variables are significant with expected signs.

Table 1. Estimation of Tariff Equation of Iran's Agricultural Sector.

Variables	Parameters	Standard Error
Concentration Index	0.081 ***	0.0047
Intra-Industry Trade	-0.192 ***	0.0325
Import Penetration Ratio	-0.628 ***	0.017
Degree of Processing	0.931 *	0.471
Wage	-0.752***	0.119

*.**.and.*** are significant at 10 ,5 and 1 percent level respectively.

$R^2 = 0.94$ Method: OLS Number of Observation = 100

Source: Research results.

Table 2 also indicates descriptive and analytical results. First two columns show tariff lines (based on HS 8-digit classification) and output names. “Import/Output” and “Export/Output” ratios of each product have been brought in the third and fourth columns showing their

[1] . See Cadot et al.(1997) for a theoretical justification and Anderson (1987) for empirical examples. For earlier studies see Rodrik,D(2008), Nunn,N and Trefler,D (2010)

[2] Madani ,D. and olarreaga,M. (2002)

relative positions in agricultural trade. Last 3 columns include actual tariffs, optimal tariffs (fitted values estimated from equation 1) and finally Political Protection Indicator (I_i).

The political-economy analysis also allows us to identify products where tariffs are above their political optimum. We define these products as those where the tariff fitted value obtained is larger than actual applied tariff. These are over-protected products. According to the results coming out of table 1 and 2, the central government should take serious measures in order to optimize tariffs politically. These measures, as Madani,D. and olarreaga,M. (2002) applied in a case study of Egypt, have been discussed in the five categories below:

First, the most important over-protected crops are: Beef, Lamb, Cheese, Peach, Plum, Strawberry, chicken, Potato paste, Processed olive , Peanut, Marmalade, Sauces, Sweets, Macaroni, Biscuits, Processed Citrus and Fruit Juice .These are all products where the average tariff is above 30 percent. Given that they tend to be relatively over – protected, as suggested by the political economy variables, tariff reductions should not be politically costly and consequently should happen soon by the central government.

Some of these products consist of processed products which implies that tariff reductions will also reduce the extent of tariff escalation in Agriculture`s tariff structure, contributing to efficiency gains due to resource reallocation and income distribution. Moreover, most of these over – protected sectors are not involved in export activities (see table 2). The high levels of protection are distorting the allocation of resources to these activities in which agricultural sector has apparently a low comparative advantage. Reallocating resources from these sectors to the rest of the economy by lowering tariffs in these over-protected sectors should therefore, not only have a low political cost, but also provide a boost on exports of products in which agricultural sector has a comparative advantage.

Table 2. Trade description for some selected products, (HS 8-digit classification)

Tariff Line	Output	Import/Output Ratio	Export/Output Ratio	Actual Tariff	Optimal Tariff	Political Protection Indicator
02010000	Beef	0.012	0	50	33	1.51
02040000	Lamb	0.003	0.001	50	29	1.72
02070000	Chicken	0.023	0	50	35	1.42
04010000	Milk	0	0	20	30	0.66
04202190	Cream	0	0	30	24	1.25
04031000	yogurt	0	0	15	21	0.71
04050000	Butter	0.03	0.012	15	12	1.25
04060000	Cheese	0.04	0	50	37	1.35
04070000	Egg	0	0.0004	25	33	0.75
04090000	Honey	0.06	0.004	75	53	1.41
06030000	Flowers	0.007	0.002	70	51	1.37
07010000	Potato	0	0.0022	30	21	1.42
07020000	Tomato	0	0	25	38	0.65
07031000	Onion	0	0	25	39	0.64
07032000	Garlic	0	0.01	50	34	1.47
07061000	Carrot	0	0	25	35	0.71
07070000	Cucumber	0	0	25	41	0.60
07093000	Eggplant	0	0	20	25	0.80
07095100	Mushroom	0.002	0.001	20	23	0.86
07096000	Pepper	0	0	20	27	0.74
07011200	Olive	0.034	0.013	20	22	0.90
07131000	Pea	0.039	0.004	20	17	1.17
07131300	Bean	0.006	0.001	20	25	1.25
07134000	Lentil	0.00058	0.00035	20	13	1.53
07802130	Almond	0.056	0.0009	70	52	1.34
08023000	Nut	0.021	0.007	70	59	1.18
08025000	Pistachio	0	0.61	50	19	2.63
08030000	Banana	7.6	0	50	41	1.21
08041000	Date	0.012	0.14	50	29	1.72
08042000	Fig	0.022	0.011	50	40	1.25

08051000	Orange	0.034	0.001	50	31	1. 61
08052000	Tangerine	0.036	0.071	50	39	1.28
08055000	Lemon	0.004	0.052	40	35	1.14
08060000	Grape	0	0.006	40	38	1.05
08070000	Melon	0	0.009	40	34	1.17
08081000	Apple	0.004	0.001	50	42	1.19
08082000	Pear	0	0	40	51	0.78
08091000	Apricot	0	0	40	36	1.11
08092000	Cherry	0	0	50	46	1.08
08093000	Peach	0	0.0021	40	32	1.25
08094000	Plum	0	0	50	38	1.31
08101000	Strawberry	0.038	0	50	33	1.51
08102000	Mulberry	0	0	50	42	1.19
08105000	Kiwi Fruit	0.001	0.25	50	37	1.35
08130000	Dried Fruits	0.014	0.002	50	44	1.13
09020000	Tea	0.512	0.061	30	26	1.15
09094000	Cumin	0	0.62	40	25	1.6
09102000	Saffron	0	0.73	50	32	1.56
10010000	Wheat	0.43	0	20	22	0.90
10030000	Barley	0.33	0	20	23	0.86
10050000	Maize	1.93	0	30	20	1.5
10060000	Rice	0.27	0	20	31	0.64
11010000	Wheat Mill	0.021	0	30	27	1.11
11022000	Maize Mill	0.037	0	30	25	1.42
11023000	Rice Mill	0.0301	0	30	25	1.2
11029000	Barley Mill	0.026	0	30	22	1.36
12021000	Soya	3.151	0	30	19	1.76
12020000	Peanut	8.29	0	30	22	1.36
12050000	Colza	0.036	0	20	19	1.57
15071200	Soya Oil	7.18	0	30	35	0.85
15089000	Peanut Oil	0.32	0	50	56	0.89
15091000	Olive Oil	0.28	0	50	44	1.13
15152900	Maize Oil	0.52	0	50	56	0.89
15155000	Sesame Oil	0.27	0	30	27	1.11
16010000	Sausage	0.08	0.011	50	39	1.28
17010000	Sugar	0.41	0	30	28	1.07
17040000	Sweets	0	0.003	50	38	1.31
18050000	Cacao Powder	0.72	0	30	32	0.93
19022000	Macaroni	0	0	40	25	1.6
19040000	Processed Cereal	0.071	0	40	44	0.90
19050000	Bakery Products	0.001	0	40	41	0.97
19053100	Biscuit	0.026	0.011	40	34	1.17
20020000	Tomato Paste	0	0.002	30	27	1.11
20041000	Processed Potato	0	0.020	40	33	1.21
20050000	Processed Vegetable	0	0	40	43	0.93
20057000	Processed Olive	0	0.005	50	41	1.21
20071000	Marmalade	0	0	40	29	1.37
20083000	Processed Citrus	0.006	0.022	50	37	1.35
20090000	Fruit juice	0.008	0.017	40	32	1.25
21032000	Sauces	0	0	40	34	1.17
24020000	Cigarette	0.66	0.017	30	19	1.57
24030000	Tobacco	2.17	0	40	31	1.29

Source: Research results.

Second, under-protected products are defined as those where the tariff fitted value obtained is not larger than actual applied tariff (i.e. , the indicator in the last column of table 2 is smaller than 1)**.** The top under – protected

products (i.e, those for which the indicator in table 2 has the lowest values) are: Onion, Wheat, Milk, Yoghurt, Egg, Tomato, Carrot, Cucumber, Eggplant, Mushroom, Pepper, Olive and Rice. These are all sectors in which the average tariff is below 30 percent and therefore should not be affected by a tariff reduction that reduces the highest tariffs. The results obviously indicate that most of agricultural crops (first stage processed products) have been under-protected, so poor farmers and smallholders have been hurt from the lack of government`s tariff protection.

Third, some products have average tariffs above (or equal) 30 percent while the value of their political indicator in table 2 is below 1. These are products in which tariff reduction will be politically costly and a longer adjustment period may be necessary. Note that some of these products consist of fully-processed or semi-processed products. These lines consist of Peanut Oil, Maize Oil, Processed Cereal, Cacao powder, Bakery product, Processed vegetables. Long-run tariff reduction in these cases will alleviate inequality and poverty within the agricultural sector. Tariff reductions in these sectors will probably lead to reallocation of resources from inefficient producers that sell within the domestic market to more efficient producers that aim towards foreign markets. Some products such as cacao powder and olive are included in this group. Given that within agriculture reallocation implies relatively low adjustment costs, the adjustment period for these products could be shorter.

Fourth, it is also easily recognized that some products in table 2 have received high tariff protection in spite of their low import penetration ratio (Flowers, Garlic, Apricot, Plum, Mulberry, Processed citrus, …). In this case, neither producers nor government gain from high tariff protection, but it raises the gap between average nominal tariff and average Import-weighted Tariff. Tariff cut for these products rationalizes tariff protection in agricultural sector.

Fifth, the rest of crops have a high export/output ratio in the fourth column of table 2. Date, Kiwi Fruit, Cumin and saffron are included in this group. Reducing tariffs in these products will cause reallocation of resources into more efficient products with a more outward oriented production structure. As regards smallholders are more vulnerable than full-processed producers, domestic protection policies should replace tariff protection in order not to harm subsistence agriculture in Iran. Indirect forms of subsidy seem to be effective instrument.

Conclusion: The history of Iranian agricultural economy obviously demonstrates government`s interference in favor of industrial and fully-processed products rather than agricultural crops. This paper provided a political analysis of tariff reduction trend in favor of agricultural sector to improve competitive condition and economic growth as well as tariff regime amendment of this sector. Firstly, theoretical and empirical models were presented. Secondly, tariff equation of agricultural sector, fitted tariffs, Political Protection Indicators, over-protected and under-protected products were identified, and finally results were discussed. Political variables as independent variables in tariff equation included concentration index, Import/output ratio, Intra-industry trade, degree of processing and wage. The overall fit of equation was relatively good and variables tended to have expected signs, at high significance level. Afterwards, political optimum tariffs and Political Protection Indicators were estimated for all products. This political protection analysis allowed the identification of two sets of highly protected products: those in which tariff reduction are going to be politically difficult (Peanut Oil, Maize Oil, Processed Cereal, Cacao powder, Bakery product, Processed vegetable) and those in which tariff cuts are not politically costly (such as Peach, Plum, Strawberry, Beef, Lamb, Cheese, chicken, Potato paste, Processed olive , Peanut, Marmalade, Sauces, Sweets, Macaroni, Biscuits, Processed Citrus and Fruit Juice). The first group could be given a longer adjustment period. For the second group tariff cuts could be more speedy. Both groups include mostly semi or fully processed products. In both cases tariff reductions would improve resources allocation and efficiency within the sector. So, strong measures should be taken to reduce tariffs on semi and full-processed products immediately in favor of agricultural crops and smallholders. The rest of results obviously demonstrates that most of agricultural crops (first stage processed products) have been under-protected, so poor farmers and smallholders have been hurt from the lack of government protection. Since farmers are much more vulnerable than full-processed producers, domestic protection policies ought to replace tariff protection. In other words, tariff reduction policy for first stage processed products requires a longer period accompanied by meaningful domestic protections.

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APPENDIX

Variables Construction

Tariffs: Nominal tariffs for selected products of the HS 8-digit classification.

Concentration Index: (Output of agricultural sector /number of firms in agricultural sector)/ (Output in product i /number of firms in product i)

Import Penetration Ratio: Import/gross output

Level of Processing: The average of the level of processing determined by WTO at the HS 8-digit classification. The WTO classification gives a value of 1 to first stage processing goods, a value of 2 to semi-processed goods and a value of 3 to fully-processed goods.

Intra-industry Trade: 1-[(Import + Export)/(Import - Export)]

Wage: Labor cost /number of employees